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An Address.¹

THE CONTROL OF TUBERCULOSIS IN TASMANIA.

By T. H. GODDARD, C.B.E., B.A., M.B.,
President of the Tasmanian Branch of the British Medical Association.

In Tasmania for forty years prior to 1945 the principal anti-tuberculosis activity was the Tasmanian Sanatorium, controlled by a private committee and financed by public subscription, with a government subsidy, and staffed by honorary physicians. For the last ten years of that period two chest clinics were also operating. There was also a small annexe at the Launceston General Hospital for the accommodation and treatment of patients. Even with these limited facilities, we were able in Tasmania, as in Australia generally, to record a diminution in the annual death rate from 160 per 100,000 of population in 1882 to 40 per 100,000 in 1940.

Collapse therapy (by the production of artificial pneumothorax) was fairly extensively practised during the ten years prior to 1945, although other surgical measures such as pneumolysis and thoracoplasty and phrenic crush were not in vogue.

For some time it had been evident that a Tuberculosis Division of the Public Health Department should be created with a full-time director in charge. This was brought about by the Tasmanian Government in 1945. The director was to control and to coordinate the various agencies which were being employed in the attack on tuberculosis in Tasmania. This necessitated in the first place the taking over of the Tasmanian Sanatorium from

the committee and the placing of it under government control.

I think this a fitting occasion to give a brief account of the position as regards tuberculosis in this State, based on what has already been attempted, with the aid of the facts and figures of our annual report for the year January to December, 1946, and our proposals for the future.

Anti-tuberculosis activities may be visualized under four headings: (a) social and educational measures; (b) treatment and after care of the individual patient; (c) the diagnosis of the suspected case and examination of contacts, and other activities of the chest clinics; (d) the mass X-ray examination of the apparently healthy.

Social and Educational Measures.

For many years the statement of Sir Pendrill Varrier Jones, "The working man simply cannot afford to have tuberculosis", has been a reproach to all anti-tuberculosis work. Up till the present the married man in Tasmania with tuberculosis has been granted an invalid pension of £1 12s. 6d. per week, plus 15s. for his wife, 5s. for the first child and 7s. 6d. for each additional child. The single man or woman was allowed an invalid pension of £1 12s. 6d. per week. In certain cases (in Tasmania) a small additional relief was available from State social services. The Commonwealth Government allotted an additional sum of £250,000, of which Tasmania's quota was £12,000.

The object of this special grant was: (i) to encourage sufferers to refrain from working and to take treatment, (ii) to minimize the spread of tuberculosis, (iii) to promote the better treatment of tuberculosis.

It was at first left to the States to draw up their own scheme of payments to sufferers, and Tasmania drew up a scheme which meant that a single man before entering a sanatorium and after leaving (till fit for work) would be receiving in all £3 per week and a married man would be receiving at least up to £4 17s. per week.

¹Read at the annual meeting of the Tasmanian Branch of the British Medical Association on February 8, 1947.

It was later decided by the Federal Government that a uniform system of payments be adopted, and at a conference at Canberra it was resolved in view of the fixed amount of the Commonwealth grant available, and in view of the fact that at this stage adequate figures of the prevalence and distribution of tuberculosis were not available, to recommend that the amount payable from the Commonwealth grant should be a maximum of 15s. per week per man and wife with the addition of 5s. for each child under sixteen years of age. The amount payable to a single person without dependants will be a maximum of 10s. per week.

So far our figures show that we can grant much more liberal aid than the 15s. and 10s. resolved at the Federal conference, and this will be brought forward at a conference shortly to be held.

Housing and Food.

In our Tasmanian campaign it was felt that it did not require the Public Health Department to draw attention to the importance of housing and food. We would occupy ourselves with the job that lay nearest to our hand.

Education and Propaganda.

An attractive booklet couched in simple language, entitled "What You Should Know About Tuberculosis", was brought out. Copies have already been placed in many homes, and we expect soon to have one placed in every home in Tasmania.

Short Press notices of educational value are forwarded weekly to each of the three daily newspapers for publication. Pamphlets giving instructions to patients whilst awaiting admission to the sanatorium, and showing how to deal with germ-soiled things and how to kill tuberculosis germs, are sent to the household immediately upon notification of a case. Printed instructions to nurses working in tuberculosis wards are forwarded to hospitals for handing to every nurse on the staff. Information pamphlets are handed to all patients entering sanatoria. A number of public lectures on tuberculosis have been given and a film has been shown.

The recently formed Government Photographic Department has undertaken to produce three sound films dealing with the working of a sanatorium, the activities of a chest clinic and the mass X-ray unit in action. The last mentioned will be used in our educational campaign. The commercial broadcasting stations have promised their cooperation.

Central Register.

For some time we have been busy compiling a central register which will give us the essential facts of every notified infection for the past five years, recording amongst other details: (i) How the case was discovered. (ii) The predominant symptom. (iii) The X-ray report on discovery. (iv) The mode of sputum examination. (v) Stage of disease on discovery. (vi) Family history. (vii) Kind of treatment given. (viii) Condition of patient yearly up till seven years after notification.

Notifications.

The pulmonary tuberculosis notifications for the State are shown in Table I.

The deaths from non-pulmonary tuberculosis numbered 23 in 1945 and 24 in 1946.

The deaths from all forms of tuberculosis in Tasmania for 1946 are shown in Table II. The death rate was 44 per 100,000.

Diagnosis.

Rules for procedure in examination for tubercle bacilli or minimal standards, and a standard classification as regards extent of disease, were adopted and are being followed out.

Diagnostic Methods.

A direct smear of a morning specimen or of a twenty-four hours specimen is examined. If the result is negative, the same specimen is concentrated and reexamined. If this result is negative, the same specimen is incubated

in a culture medium after concentration. If the results of the examination of this first specimen are negative, the routine is repeated twice. If sputum is not obtainable, a gastric lavage is carried out and the sediment is examined by direct smear, by cultural methods and by animal inoculation. This method is also used if the results of the examination of specimens continue to be negative or if patients have but little sputum.

For patients with advanced disease and a positive sputum, the sputum is examined every three months by direct smear. If the result becomes negative, a concentration is made or a culture is prepared every two months.

TABLE I.

Group.	Male.		Female.		Total.	
	1945	1946	1945	1946	1945	1946
Under 15 years	1	6	2	2	3	8
15 years and under 25 years ..	12	21	30	31	42	52
25 years and under 35 years ..	29	25	27	22	56	47
35 years and under 45 years ..	26	19	11	14	37	33
Over 45 years	31	45	10	10	41	55
Total	99	116	80	79	179	195

In pneumothorax cases a concentration test is made every two months.

For classification for purposes of discharge and for prognosis three twenty-four hour concentrates are made and examined at weekly intervals, then a twenty-four hour concentration is examined every three months for six years.

Two centres were arranged for this detailed laboratory work, namely, the Commonwealth Serum Laboratories at Hobart and Launceston. Insistence was placed on the great value of the test.

Diagnostic Standards.

It was thought advisable to classify infections on discovery, according to the extent of the pulmonary lesions, as minimal, moderately advanced, and far advanced.

TABLE II.

Type of Tuberculosis.	Male.	Female.
Pulmonary	54	42
Non-pulmonary	7	6
Total	109	

Minimal lesions are light lesions without demonstrable excavation confined to a small part of one or both lungs.

In moderately advanced lesions one or both lungs may be involved, but the total extent does not exceed certain limits (slight disseminated lesions which may extend through not more than the volume of one lung, or the equivalent of this in both lungs). Dense confluent lesions, through not more than one-third of the volume of one lung, also fall within this category. The total diameter of cavities is not greater than 4.0 cubic millimetres.

Infections may be classified according to symptoms—whether they are none, slight, moderate, severe.

Clinical Status of the Treated Patient.

A patient's condition is said to be in the quiescent stage when all constitutional symptoms have vanished, when the blood sedimentation rate haemogram is normal, when the sputum is "negative", and when X-ray examination reveals satisfactory fibrosis. If this is maintained for two years the condition is spoken of as arrested. Lesions

stationary and apparently healed according to X-ray examination are apparently cured under ordinary conditions of life.

The Treatment of the Individual Patient.

Institution of a system of male nurses enables us to fill all 84 beds in the sanatorium. We have sixteen of these men at the present time attending under the direction of a sister to the male patients. This leaves the female nurses free to attend the female patients. These men, recruited from the Australian Army Medical Corps, are being instructed in the nursing of pulmonary tuberculosis. At the moment of writing this report we in Tasmania are in the unique position of having not one patient on a waiting list for entrance to the sanatorium.

We labour under the disadvantage of a sanatorium planned in the days when the institutional treatment of pulmonary tuberculosis was summed up in the word chalet (probably more of a detriment to easy and economical working of the institution than to the treatment of the patients).

We labour also under the disadvantage of Ward 20, the old annexe to the Launceston General Hospital, which from the beginning we regarded as out of date and entirely unsuitable.

We planned two sanatoria for Tasmania, south and north, that is, sanatoria under the modern conception of sanatoria built near large centres of population, with the modern ideas of rest and surgical treatment and access to all amenities with all that this latter implied as regards professional and house staff, as opposed to the older conception of the home in the country with plenty of fresh air. The first of these two sanatoria, for 60 beds with provision to extend to 90, was long since planned for a chosen site in Launceston, and a site was chosen and plans were made for a sanatorium at Hobart for 200 beds. The underlying principle (as regards available number of beds) was three beds per annual death, that is, 300 beds for Tasmania. With a realization of the difficulties attendant on building operations in these post-war days, it was decided to push ahead with temporary plans. The first of these was to construct an additional thirty beds at the Tasmanian Sanatorium at Hobart, thus providing for 110 patients, and secondly, the taking over of the Military Convalescent Depot at Perth to provide for fifty patients. The first of these two projects is now almost completed (after a period of nine months, which in previous happier days would have been six weeks). The second project we are still grappling with (plans are all prepared).

Two ideas have dominated our thinking: (i) To provide sufficient beds (temporary they may be) for all notified patients who their physicians consider should be placed in sanatoria for treatment and for isolation. (ii) To ensure that the most modern treatment and surgical aid needed in sanatoria should be provided. Figures which will be incorporated in this address will, I trust, demonstrate that the modern treatment of collapse therapy has not been neglected. To supplement our pneumothorax therapy, we had Dr. Muir appointed as thoracic surgeon for Tasmania.

Great improvements have been instituted at the sanatorium at Hobart.

A resident medical officer was appointed, a clerk typist and increased staff. A great deal of alteration had to be effected at the sanatorium as regards buildings, as these were not in the best condition when handed over.

Sputum is now dealt with on the most approved lines; an oil burning disinfecter deals with it as with all refuse. Cartons are now inserted in each sputum mug.

Talking pictures are shown to the patients each month, and a small committee was instrumental in purchasing a talking picture apparatus as a permanent fixture to be located at the sanatorium.

A modern library of 300 books was installed. This is not only for the interest of patients, but is intended as an occupational and vocational activity, really our first step in this latter direction.

Craft teaching is given by the Red Cross. This it is expected will lead to a vocational teacher. It is hoped that a workshop will shortly be set aside at the sanatorium.

Thoracic surgery has been performed at Royal Hobart Hospital, but it was decided to take over ten beds at Vaucluse Infectious Diseases Hospital and to construct a theatre for this work. This it is expected will shortly be completed.

The modern idea of consultation between physician and surgeon at the sanatorium and chest clinic was instituted, and we feel that as regards modern care an honest endeavour is being made to give tuberculosis sufferers the latest in treatment.

The figures for the year indicate that the great majority of notified patients have availed themselves of institutional (sanatorium) treatment. These figures also suggest that modern collapse therapy (artificial pneumothorax, pneumo-

TABLE III.
Analysis of the Results on Initial Assessment
(6,915 Persons Examined).

Group.	Number of Persons.
Non-tuberculous	52
Previously diagnosed tuberculosis	9
Tuberculous lesions requiring no action	22
Newly discovered "significant" tuberculous lesions:	
Operation cases	15
Treatment	17 } 32

lysis, phrenic crush and thoracoplasty) has been applied to a reasonable proportion of admitted patients; also that sputum examination by concentration, culture and also gastric lavage has been used to detect the presence of the tubercle bacillus.

Ward 20 at Launceston and the Devon Hospital have been used as auxiliary institutions. Further, an attempt has been made in Tasmania to coordinate civilian and repatriation tuberculosis activities by the establishment of a clinic at the Repatriation Hospital.

One interesting item is disclosed in the work of the chest clinics (Hobart, Launceston) that during 1946 24 patients with pulmonary tuberculosis were discovered by the sisters calling up for examination the contacts of notified tuberculosis patients (who otherwise would not have been found).

TABLE IV.
Newly Discovered Significant Tuberculous Lung Lesions (32 Cases).

Age. (Years.)	Males.			Females.		
	Treated Cases.	Observed Cases.	Total Cases.	Treated Cases.	Observed Cases.	Total Cases.
14 to 19	—	—	—	1	—	1
20 to 24	—	1	1	—	—	—
25 to 34	2	3	5	—	—	—
35 to 44	2	2	4	—	3	3
45 to 54	2	2	4	1	—	1
55 and over	3	4	7	—	—	—
Total	9	12	—	8	3	—

Several other matters of interest must here be mentioned.

1. Patients with pleurisy with effusion, treated in the general hospitals and not admitted to the sanatorium, are reported to the clinic, and placed on observation when discharged to their homes where they rest under supervision for a period of at least four months; the clinics ensure that they are examined by X rays and otherwise for a period of two years after discharge from hospital.

2. Cases of tuberculous meningitis in children in the general hospitals are noted by the clinics, and an endeavour is made by examination of household contacts to discover the infecting agent.

3. The clinics are performing a useful function in investigating cases discovered at mass X-ray examinations when the X-ray findings have been suspicious.

4. By examination of contacts of persons known to be infected the oversight of patients discharged from the sanatorium is undertaken, in addition to an investigation of suspicious cases in persons referred by general practitioners.

In an effort to safeguard the health of nurses in Tasmanian hospitals (as regards tuberculosis) we have taken the following steps.

In the first place we have tried to make the following scheme a standard practice in the large hospitals. When

TABLE V.
Non-Tuberculous Conditions.

Condition.	Number of Cases.
Scoliosis	18
Dextrocardia	2
Emphysema	2
Upper respiratory lesion	1
Basal fibrosis	5
Pleural effusion	1
Atypical pneumonia	1
Encysted effusion	1
Hernia of the diaphragm	1
Cardiac condition	5
Aneurysm	2
Thyroid condition	2
Chronic bronchitis	3
Calcified cervical gland	1
Hydatid disease	2
Pleural thickening	1
Bronchial congestion	1
Pulmonary fibrosis (non-tuberculous)	3

a nurse enters upon her course of training she is subjected to the Mantoux test and her chest is examined by X rays. If the Mantoux test gives a positive reaction, an X ray is carried out each year and oftener if the nurse's condition makes it advisable, until her training is completed. If the result of the Mantoux test is negative, the test is made again every three months until the result becomes positive. As soon as the Mantoux test yields a reaction, the chest is examined by X rays. If the nurse seems well, and her skiagram shows no abnormality, she

TABLE VI.

Showing Results of Large X-Ray Film Examination of Person Recalled in Hobart Survey.

Group.	Number of Persons.
Persons passed on large film (no abnormality discovered) ..	125
Persons unable to reattend to date	7
Persons with non-tuberculous conditions (see Table VII) ..	73
Persons with previously diagnosed tuberculosis:	
Not healed	3 } 5
Healed	2 }
Persons with tuberculous lesions requiring no action:	
Healed primary tuberculosis	28 } 31
Healed secondary tuberculosis	3 }
Persons with newly discovered "significant" tuberculous lesions (see Table VIII):	
For treatment	20 } 28
For observation ¹	8 }
Total	269

1-8 per 1,000 for treatment.

¹ This group includes one person with a questionable minimal lesion and one with a primary lesion.

is sent home for three months for rest and general care. On her return she is submitted to X-ray examination again. If she seems well and the skiagram is still clear, she returns to duty and is examined by X rays thereafter every three months. If, when the result of the Mantoux test becomes positive, she does not seem well or her skiagram shows any abnormality, she is put to bed in the sick room.

Secondly, the previously mentioned instruction card is issued to every nurse in the State.

Thirdly, as a beginning a miniature X-ray plant was installed in one of the two large hospitals to ensure the X-ray examination of the chest of every patient entering that hospital.

We embarked on our mass X-ray scheme two years ago. We approached it with some trepidation in the beginning as two great problems had to be faced—bed shortage and nurse shortage. However, in Tasmania nurse shortage was overcome by adopting the system of male nurses, and bed shortage by erection of temporary buildings. And so far we have had no cause to regret the initiation of the mass X-ray campaign.

For our State with its population of 250,000 three units were placed: (a) a stationary unit at Hobart, (b) a mobile plant to tour the areas outside the capital city, (c) a miniature plant at the Launceston General Hospital.

The stationary unit at Hobart operates in a specially constructed building, with clerk's room, cubicles and X-ray room, and a processing room where all films including those from the mobile unit are developed.

The mobile unit was mounted on a three-ton truck. This is an X-ray unit entirely with no provision for pathological and bacteriological work.

TABLE VII.

Table of Non-Tuberculous Conditions in Mass Radiography, Hobart.

Condition.	Number of Cases.
Cardiac	5
Rib abnormality	7
Scoliosis	22
Organized pleural effusion	1
Dextrocardia	1
Basal fibrosis	10
Chronic bronchitis	1
Emphysema	2
Lobar pneumonia	1
Bronchitis	11
Old emphysema	1
Bronchopneumonia	2
Post-pneumonic fibrosis	1
Silicosis	1
Hydatid of the lung	2
Pleural thickening	1
Old thoracoplasty	1
Total	70

Next, a miniature X-ray apparatus was attached to the large plant at the Launceston General Hospital, with the idea of making an X-ray examination, if possible, of the chest of every patient entering the hospital, as such a section of the population is easily accessible. This will also deal with the problem and the danger of the unsuspected tuberculosis patient in the large hospital, and is a procedure, incidentally, of great value in safeguarding the nurse's health. This is breaking fresh ground in anti-tuberculosis work in Tasmania.

In the case of the stationary unit, we have gained the cooperation of the Chamber of Commerce, of the Department of Education, of the heads of secondary schools and of the leaders of large and small industries.

In the case of the mobile unit, the staff consists of a technician and the driver-clerk, who, when the vehicle is stationary, does the clerical work. Also a sister from the chest clinic proceeds separately to the town of operation and supervises the work. Though the mobile unit has two cubicles, in the towns of operation the van draws up alongside the door of a hall, and one or two rooms of the hall are used as dressing and undressing rooms and clerk's room.

Approximately one week prior to the visit of the unit to a town, arrangements are made with the municipal authorities to call a public meeting. All organizations, trade and otherwise, in the district are communicated with and asked to send representatives. An officer of the

department attends the meeting and forms a committee, which usually consists of a good cross-section of the community. The organizations usually represented are: the Red Cross Society and the Country Women's Association, who supply ladies to assist on the unit; the Labour Party; the Liberal Party; Parents and Friends' Associations; Mothers' Clubs; Trades and Labour Councils; Saint John Ambulance Brigade; the Waterside Workers' Federation. Valuable assistance is always given by members of parliament, school teachers, municipal health inspectors, and other interested people.

A section of the town is allotted to each organization. This section is covered by a house-to-house canvass. The committee distribute circulars and booklets—"What You Should Know About Tuberculosis". Publicity is given to the visit by courtesy of radio stations and *The Advocate* and *The Examiner* newspapers. Business people arrange to print and display attractive notices, and circulars are distributed through schools. Slides are shown at picture theatres.

A sister from the Launceston Chest Clinic arranges for all "case contacts" to be examined while the unit is operating in the district. The Director of Tuberculosis visits the town when convenient and gives an address on "The Mass X-Ray Scheme".

TABLE VIII.

Showing Newly Discovered "Significant" Tuberculous Lung Lesions in Respective Age Groups in the Hobart Survey.

Age. (Years.)	Treatment.			Observation.		
	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.
Under 14	2	—	2	—	2	2
14 to 19	—	1	1	1	1	—
20 to 24	2	1	3	—	2	2
25 to 34	2	3	5	2	—	2
35 to 44	4	—	4	1	1	2
45 to 54	4	—	4	—	—	—
55 and over	1	—	1	—	—	—
Total	15	5	20	3	5	8

At the three factories visited in Launceston circulars were distributed by the management. With the addition of new power boxes it is now possible for the unit to be in operation five minutes after entering a town.

Hobart Unit.—At the Hobart unit over 360 employers were interviewed during the year. These included heads of factories, shops, cafés, hotels, offices, foundries, government departments *et cetera*. All school children of the age of fourteen years and over were examined. Appeals were made through the following trade unions or organizations: Hairdressers' Union, Waterside Workers' Federation, pharmaceutical chemists' organization, Chamber of Commerce, Australian Railways Union, mothers' clubs, parents and friends' associations, Bookmakers' Club, Licensed Victuallers' Association and friendly societies. Arrangements were made for the staffs of several hospitals to be periodically examined.

Seven hundred and thirty-nine "case contacts" were examined through the Hobart Chest Clinic. All patients attending the pre-natal clinic at the Royal Hobart Hospital were asked to attend. Of the people communicated with, 78% submitted themselves for examination.

As the success of the scheme depends entirely on the cooperation of the business people and the general public, the division has concentrated on: (a) causing employers as little inconvenience as possible, (b) giving courteous attention to all classes of people, (c) elimination of undue delay.

Mass Radiography.

Three records of mass radiography may be considered under three headings: (a) the record of the stationary unit at Hobart (and Burnie) for 1945, (b) the record

of the stationary unit at Hobart for 1946, (c) the record of the mobile unit for four months in 1946.

The Survey in 1945.

In the organized voluntary campaign for mass X-ray examination in Hobart factories and organized bodies (including Burnie paper mills) the total number of people who asked to be examined by X rays was 5,500. Of these, the total number who were examined was 4,665, or approximately 85%.

This statement is of value as indicating the percentage of response to an organized appeal to business houses and factories. This appeal was made firstly to the Chamber of Commerce and then by visiting business houses and asking the heads of the houses to request their employees to come along for examination. As stated, this resulted in an 85% response.

In addition to the 4,665 adults submitted to X-ray examination as a result of this appeal, an additional 2,250 adults presented themselves, making a total of 6,915 to be examined. This number of 2,250 is made up of those who came along of their own accord and others (personnel of hospitals and contacts) who were asked to come.

TABLE IX.

Place.	Number of Persons.
Hobart:	
Cadbury-Fry-Pascall	481
Titan Nail Company	46
Sutex Proprietary Limited and C.R.T.S., Derwent Park ..	199
Devonport	2,241
Ulverstone	1,171
Penguin	358
Wynyard	480
Stanley	445
Smithton	914
Yolla	126
Burnie	1,080
Burnie Paper Mills	501
Railton	288
Sheffield	470
Launceston:	
Patons and Baldwins	1,484
Railway Workshops	786
Alexander Racket Factory ..	83
Total number of people examined	11,153

The results of this Burnie survey (April, 1945) and Hobart survey (July 10, 1945, to October 31, 1945) were as follows:

Total number of adults examined by X rays ..	6,915
Total number passed on miniature film	6,745
Total number recalled for examination with a full-sized film (17 x 14)	170
Total number passed on large film	107
Total number recalled for investigation	63
(These, so far, have been referred to own doctor or chest clinic.)	

The results of these surveys are analysed in Table III. In Table III reference is made to 22 tuberculous lesions requiring no action. These were old, apparently healed lesions, "negative" clinically; the patients were dismissed at once with a letter to the general practitioner for his records.

The important cases were those in which newly discovered significant tuberculous lesions presumed to require medical action of some kind were discovered. There were 32 such cases (see Table IV). All the patients were requested to consult their own doctor. To the doctor a report of X-ray findings and the X-ray film were forwarded, with the intimation that if he so wished, the patient's condition would be further investigated at the chest clinic. Those patients who had no doctor were investigated at the chest clinic.

This resulted in a subdivision of the patients with these significant lesions into: (1) Those required to leave work immediately for sanatorium and notified as suffering from active pulmonary tuberculosis. The number of these was

17 out of a total of 6,915 examined with X rays, that is, 0.24% or 2.4 per 1,000. (ii) Those requiring out-patient observation, including periodical X-ray examination whilst remaining at work—observation cases. Some might be required to leave work, but with no institutional treatment. Some would require a single precautionary check. There were fifteen such patients. It is quite possible that some (a few) of these patients will ultimately be transferred

TABLE X.
Showing Results of Examination with Large X-Ray Films.

Group.	Number of Persons.
Persons passed on large films (no abnormality detected)	78
Persons unable to attend to date ¹	55
Persons with non-tuberculous conditions (see Table XI)	93
Persons with previously diagnosed tuberculous lesions:	
Not healed	4 } 7
Healed	3 }
Persons with tuberculous lesions requiring no action:	
Healed primary tuberculosis	36 } 41
Healed secondary tuberculosis	5 }
Persons with newly discovered "significant" tuberculous lesions ² (see Table XII):	
For treatment	7 } 31
For observation	24 }
Total	305

¹ This group includes people who have had insufficient time to date to return.

² This group includes two persons with probably healed tuberculosis, one person with probable fibrosis, two persons with pleural effusion, one person with a probable left apical lesion, one person with an abscess or tuberculosis, and one with probable chronic fibrotic tuberculosis.

to the first subdivision as suffering from active tuberculosis and therefore notifiable. Thus the second subdivision requires a follow-up analysis at stated time intervals.

The 52 non-tuberculous lesions discovered are analysed in Table V.

Hobart Survey, January 1, 1946, to December 31, 1946.

The total number of people passed on the miniature film in the Hobart survey, January 1 to December 31,

TABLE XI.
Non-Tuberculous Conditions, Mobile X-Ray Unit Survey.

Conditions.	Number of Persons.
Pulmonary abscess	3
Cardiac	9
Hernia of stomach	2
Old rib resection	6
Scoliosis	32
Non-tuberculous congestion	1
Pulmonary fibrosis	14
Organized pleural effusion	2
Silicosis	2
Neoplasm (?)	1
Bronchitis	2
Hydatid cyst of the lung	2
Rib abnormality	1
Dextrocardia	2
Old rib fracture	1
Hodgkin's disease	1
Enlarged thyroid gland	1
Bronchiectasis	2
Spontaneous pneumothorax	1
Calcified cervical glands	1
Total	87

1946, was 11,215. The total number of persons recalled for large film (17 inch x 14 inch) examination was 269. This makes the total number of persons submitted to X-ray examination 11,484. The results of the large film examination are shown in Table VI.

The important cases, that is, the newly discovered tuberculous lesions presumed to require medical action of some kind and classified as significant lesions, were

28 in all. All the patients were requested to consult their own doctor to whom a report of X-ray findings and the X-ray film would be forwarded if he desired it, with the intimation that if the doctor so wished the condition would be further investigated.

The majority of these persons were investigated at the Hobart chest clinic. Twenty of these patients were notified as suffering from active pulmonary tuberculosis and were recommended for sanatorium treatment. Eight were kept by the clinic under observation to determine the activity of the lesions, if any, by periodical X-ray examination and so on.

It must be mentioned that a fair percentage of these Hobart people in this 1946 mass X-ray examination were people who had been submitted to X-ray examination in 1945.

The number of persons with newly discovered significant tuberculous lesions examined by the Hobart stationary unit and requiring treatment was 1.7 per thousand examined. The number of persons with newly discovered significant tuberculous lesions kept for observation by the Hobart stationary unit was 0.7 per thousand examined. The number of persons with newly discovered significant tuberculous lesions retained by the Hobart stationary unit for treatment and observation was 2.5 per thousand examined.

TABLE XII.
Showing Newly Discovered "Significant" Tuberculous Lung Lesions in Respective Age Groups, Mobile X-Ray Unit Survey.

Age. (Years.)	Treatment.			Observation.		
	Males.	Fe-males.	Total.	Males.	Fe-males.	Total.
14 to 19	1	—	1	—	1	1
20 to 24	1	—	1	1	1	2
25 to 34	—	2	2	3	—	3
35 to 44	1	1	2	4	2	6
45 to 54	1	—	1	3	2	5
55 and over	—	—	—	6	1	7
Total	4	3	7	17	7	24

The Mobile Unit Survey.

In the mobile X-ray unit survey from August 12 to December 31, 1946, 11,153 persons were examined. The places and some of the commercial firms visited with the number of persons examined in each instance are shown in Table IX.

Of the 11,153 persons examined, 10,848 were passed on the miniature film. The number of persons recalled for examination by the large film (17 inches x 14 inches) was 305. The findings in these cases are shown in Table X.

This mobile survey must be looked on as incomplete in regard to final results as it will be seen that 55 of the persons who were asked to have an examination with a large film have not yet been examined, partly because of the mobile unit having moved away from their area. We are engaged on a follow-up in these cases, and are hoping to solve this problem which arises in country areas. There is also the problem of inaccessibility to a clinic in the country areas; this difficulty will soon be largely solved by the establishment of a clinic in the north-western area where the mobile unit mainly operated.

It will be seen that we are well on the way to an intensive survey in Tasmania, with the mobile unit visiting in the course of the year all the areas outside the capital city and with the stationary unit in Hobart. It is hoped to make further arrangements in regard to Launceston.

Finally a hostel to accommodate thirty ex-sanatorium patients is now in operation at Hobart. It is hoped to develop this on the lines of the Russian night sanatorium (primarily for those who are engaged in part-time or full-time work) so that the patients may sleep and dine at the hostel instead of as formerly at a boarding house amongst healthy citizens.

SOLAR PHOTOPHTHALMIA.¹

By J. M. DWYER,
Adelaide.

Geography and Climate.

In 1942, when ships were insufficient to meet our needs, a supply line opened in August, 1940, was being developed. The road joined the railheads at Alice Springs (latitude 23°38' S.) and Larrimah (about latitude 15°3' S.) or Birdum, a distance of 620 miles. The country between is little more than desert for nearly 400 miles from Alice Springs, which has a rainfall averaging just over ten inches a year, varying between three and twenty-eight. Barrow Creek, the first overnight staging post from Alice Springs, is 196 miles north, and during the war at one stage had about seven inches of rain in three years. The second northern stage is Banka Banka (about latitude 18°3' S.) 171 miles further on, and Elliott, near Newcastle Waters, 94 miles further still. The summer temperature varies indirectly as the humidity, which may be very low. Temperatures of 158° F. have been recorded in the top inch or two of loose sand at Alice Springs, where the official recordings rarely reach a shade temperature of 110° F.; but one day in three from November 1 to March 31, and at Tennant Creek two days out of three, have temperatures over 100° F. Places on the road are much hotter than Alice Springs, which is only a few miles south of the Tropic of Capricorn. The average maximum temperatures from October 1 to March 31 are as follows: Alice Springs 93·6° F., Tennant Creek 96·7° F., Daly Waters 99° F. Nearly all the road to Larrimah is therefore in the tropics. For three-quarters of the distance the sky is nearly cloudless during the summer half of the year, except during periods of "wet", which may last a few days or a week; during these times the year's rain may fall in a very short time. The southern half of the road drops from a height of about 2,500 feet to 1,233 feet at Tennant Creek. During the remainder of the distance, it remains between the latter figure and 600 feet.

The dryness of the atmosphere is exemplified by the experience of travellers in rainless periods. They know well the possibility of the smart, annoying shock they can experience on touching a vehicle that has recently stopped. The clear atmosphere and astonishing distances over which one can see in this country are well known.

Incidence.

Each year from about mid-September figures showed an increase in the conjunctivitis rate of transport drivers. During 1943 as many as 1,250 personnel were on the road each day as part of the personnel required to run the convoys.

Duke Elder⁽²⁾ describes the historical aspects. The acute inflammatory reaction of the superficial parts of the eye to shortwaved light was called photophthalmia by Parsons in 1913. Xenophon refers to it in the form of snow blindness. Faucault mentions its scientific occurrence in two chemists in 1858. After this the association with electric arcs and lighting was recognized in 1879. Widmark in 1889 correlated the aetiology under natural and artificial conditions with shorter ultra-violet rays. The most potent of these is between 3,000 and 2,500 Angstrom units.

The incidence of the trouble was least from April to September. It is noted that the figures were lowest after rain and presumably cloudy skies. On comparison with the meteorological records, it is found that rain preceded some of the lowest depressions recorded on the graph; in other instances it has not been possible to ascertain whether cloudy conditions prevailed. Conversely, when periods of higher incidence occurred, rain immediately preceding them is not recorded.

The conjunctivitis which came on after an interval, generally at about midnight or in the early hours of the morning, was not purulent, and no significant bacteria could be cultivated from the affected eyes. Intense photo-

phobia and lachrymation were present, most severe on the first day. The scleral conjunctiva was intensely congested, but usually only in the areas not covered by the lids. This was more apparent than real, the existing congestion in the covered areas giving a pale appearance by contrast with exposed areas. Examination of affected eyes was often difficult because of blepharospasm. I had seen an exactly similar condition amongst members attending the Australian Imperial Force ski school at the Cedars in Lebanon, and in practice before the war I occasionally saw the condition in arc welders who referred to their trouble as "getting a flash".

The area of 11 Line of Communication Sub-area extended from the Finke River to Larrimah and the West Australian border to and including Mount Isa in Queensland. Infectious conjunctivitis, trachomatous and otherwise, is common here as in other similar parts of the continent; but these conditions bore no relation to the condition described except as complications. The sky glare conjunctivitis was present on the 420 miles of the road between Mount Isa and the North-South Road just north of Tennant Creek; but as factors such as dust and the more direct rays of the sun were involved, it is thought that the problem on this road should not be considered here.

In the compilation of the figures it is inevitable that infectious conjunctivitis would not be excluded from the weekly returns. I can state confidently that these conditions constituted the bulk of the cases after the introduction of the remedy which proved so efficacious.

The number of cases reported from October, 1942, rose to nearly 200 a week at the end of the year. This involved the loss of personnel for the equivalent of approximately 1,000 man days a week in the worst period at a very critical time.

Causes.

Speculation on the cause was considerable. In the beginning it was generally felt that the road glare was responsible; but a great proportion of people also thought the dusty conditions were to blame. It will be noted that Elliott Regimental Aid Post records a high treatment rate early in the graph (Figure I), and this section of the road was late in being covered in bitumen; but a similar state of affairs existed on the stretch between Alice Springs and Barrow Creek and beyond for a much longer period. This might seem to favour the dust theory, but the tendency to rise at the beginning of the summer weather in 1943 can be observed on the graph and by this time the whole of the road had been covered in bitumen. In any case the conjunctivitis at Elliott dropped *pari passu* with the introduction of the green strip.

The necessity of securing adequate ventilation in the roofed cabins of vehicles in the conditions of extreme heat resulted in a strong breeze of dry air pouring onto the body surfaces of the drivers and their assistants. By many it was thought that this excessive drying was responsible for the conjunctivitis. At the suggestion of the Reverend Father F. Flynn, who was also consulting ophthalmologist in the area, I arranged for a platoon of a General Transport Company to wear eye shields, anti-gas mark 2, for a trip. These shields fitted the face closely, well away from the eyes. The company chosen was one with long service in various parts of the world and was well disciplined. The result was equivocal, as it was found impossible to wear the goggles because of heat, sweat and irritation to the face. Members of the platoon stated that they felt uncomfortable and their eyes were subjected to strain. The wearing of ordinary shaped spectacles of normal glass or darkened glass was uncomfortable because of the drawing, searing sensation produced by the dry, hot wind currents. Goggles similar to those worn by motorcycle dispatch riders were tried, but the sweat and irritation to the skin caused them to be discarded. One generally found that newcomers would try some type of dark spectacles to begin with, but almost invariably discarded them after one or two trips. Eyeshades were tried also.

Reverend Father Flynn⁽³⁾ correlated the evaporation rates with the incidence of conjunctival hyperemia in convoy drivers. He considers susceptibility to be determined by the rate of lachrymation, by the width of the palpebral fissures and by the prominence of the globe. That

¹ Read at a meeting of the Australian and New Zealand Association for the Advancement of Science, Adelaide, August, 1946.

there may be a subsequent relationship with pterygia is suggested. Sometimes corneal involvement occurred in the form of superficial punctate lesions confined to a horizontal band across the cornea corresponding to the area bounded by contracted lids.

Remedy.

On December 19, 1942, I arranged for a platoon of a different transport company to paint a green strip two inches wide across the top of the windscreens. This width restricted vision to land surfaces only on level ground. When necessary, for taller drivers a curved area was removed opposite the steering wheel. Generally by this means all view of the sky was eliminated. The personnel of the platoon were not told the reason for this, but they commented on the sense of comfort the green shade gave them and survived the round trip of 1,250 miles without appreciable trouble during a period when the amount of conjunctivitis was reaching a peak of intensity. The whole company was then converted, and the results

the attendance at Alice Springs fell off, but closely paralleled the graph of total incidence. Such a faithful correlation over a period of eighteen months is beyond the mental powers of some 3,000 troops living under varying conditions.

It is thought that the altitude of the road (1,500 to 2,500 feet) during the last 100 miles or so influenced and increased the activity of short rays of the ultra-violet type, thereby setting up a chemical action in the cells of the conjunctiva and cornea. Duke Elder⁽³⁾ refers to this activity on the cornea causing swelling and damage to cells, with consequent desquamation and the appearance of eosinophilia in the superficial cells and lachrymal secretions.

Reference to the occurrence of this trouble in airmen was made about three years ago in a periodical interim supplement of "The British Encyclopedia of Medical Practice", which I have been unable to trace. It was stated that the eye trouble occurred in aeroplanes with

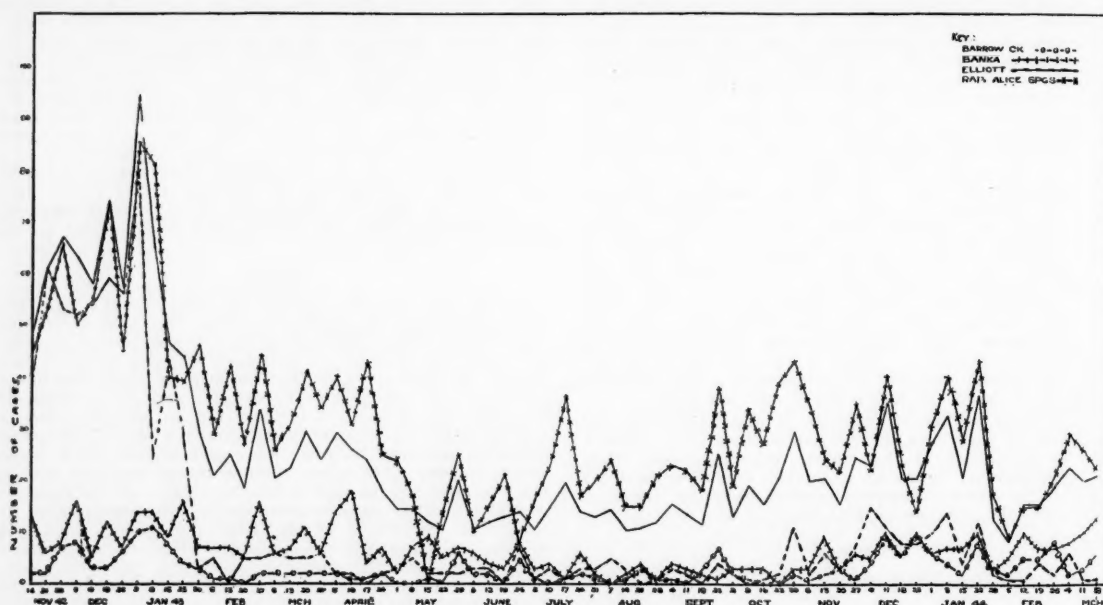


FIGURE I.—Conjunctivitis: North-South Road and Alice Springs.

justified the application of the "green strip" to every vehicle in the area; 80% of vehicles were converted by February 4, 1943.

The graph (Figure I) shows that the largest numbers of patients were always treated at Alice Springs. From this one may deduce that the worst day was the last of the nine-day schedule during which the convoys were traversing the gradually rising Central Australian Plateau at an elevation reaching about 2,500 feet at the end before dropping to 1,900 feet at Alice Springs during the last ten miles. The drop from 188 to 42 cases per week in thirty-five days from January 2 is self-demonstrative. The tendency for the figures to rise again is not appreciable until the following October, when the number of persons on the road was about the maximum, though it began to be reduced soon after.

No appreciable alteration was made in any other condition, and ultimately the results were so satisfactory that the green strip was adopted by the Commonwealth Military Forces.

Discussion.

Certain objections may be raised—for example, that the great attendance of affected personnel at Alice Springs was due to the psychological influence of an attempt to "hang on" until home was reached. Against this may be urged the fact that, after the adoption of the remedy,

transparent noses or turrets flying above the clouds in bright sunlight. Duke Elder considers the name "snow blindness" (referring to this condition on snow fields) as thoroughly unsatisfactory, since the photophthalmic symptoms are not caused by snow, but by solar energy partly reflected by snow. Eskimos suffer from the trouble, and it has been recorded in polar bears. The late Dr. H. F. Shorney⁽⁴⁾ recorded its occurrence in the Australian Alps in 1912.

The purpose of this paper, in view of the efficacy of the green strip, is to draw attention to the fact that the condition in the locality concerned and probably elsewhere was caused by absorption of rays which did not come from the earth's surface but from the sky. The sun's direct rays were rarely visible, because the roofs of the trucks' cabins kept them off for most of the day, and as the direction of travel was mainly north and south, the rising and setting of the sun would not materially affect the situation.

Summary.

1. Solar photophthalmia occurred in summer months among convoy drivers in the Northern Territory.
2. The possible influence of dust and drying as causative agents has been considered.
3. The use of a strip of green paint to obscure the view of the sky has been found efficacious in preventing the condition.

4. Neither reflection from the road nor the direct sun's rays were responsible for the condition as mere shading out of the sky controlled it.

References.

- (1) W. Stewart Duke Elder: "The Pathological Action of Light upon the Eye", *The Lancet*, Volume I, 1926, page 1137.
- (2) F. Flynn: *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume I, 1945, page 121, and *Transactions of the Ophthalmological Society of Australia (British Medical Association)*, Volume IV, 1944, page 51.
- (3) H. F. Shorney: "Snow Blindness in the Australian Alps", *The Australasian Medical Gazette*, June 22, 1912, page 654.

THE NORMAL LEUCOCYTE COUNT.

By C. R. BICKERTON BLACKBURN,
Joseph Thornton Tweddle Research Scholar for the
Royal Australasian College of Physicians.

A LARGE number of healthy men were required by the Land Headquarters Medical Research Unit at Cairns to enable the unique experiments on the suppression and therapy of human malaria to be performed. Volunteers in army units, in all States of Australia, were sent to Cairns if they were considered to be suitable experimental subjects. All of these volunteers were examined clinically and routine laboratory tests, including total and differential white blood cell counts, were performed on them shortly before they were used in malaria experiments. Only the "normal" volunteers were used, those with any evidence of disease being set aside.

An analysis of these "normal" leucocyte counts was considered to be worthy of record as the laboratory methods corresponded to those used as a routine in hospitals and in the clinical laboratories of medical practitioners.

Method of Investigation.

Material Studied.

Six hundred and forty-two volunteers between the ages of eighteen and forty-nine years were studied; the average age was 24.8 years, but 90% of them were between eighteen and thirty-five years (inclusive) of age. All of them were regarded as "normal" in so far as they had no evidence of disease apart from mechanical disabilities (for example, an amputated arm). None had been exposed to malaria.

All the volunteers were examined at Cairns, where they had been in residence from one to four weeks, between June, 1943, and January, 1946, but they came from units in all States of the Commonwealth.

The initial leucocyte counts of these volunteers, one set of observations on each man, have been analysed and are the basis of this report.

Collection of Specimens.

Specimens of blood were collected between 8.15 a.m. and 10 a.m. in the majority of instances; some specimens were collected at other times of the day, but not less than one and a half hours after the previous meal. The only exercise that had been taken by the majority of the volunteers, who reported to the laboratory one and a half hours after breakfast, was that associated with the routine of rising, bathing, eating breakfast and making their beds.

Laboratory Methods.

Blood for total leucocyte counts was collected from a finger prick and diluted twenty times in a standard white cell pipette. In the actual count all the cells lying in the four corner squares of a Neubauer type of chamber were enumerated (a total of 0.4 cubic millimetre).

Differential leucocyte counts were made by the enumeration and differentiation of 100 cells found in an evenly spread part of a blood film stained by Leishman's method.

Leucocytes were classified into neutrophile leucocytes, eosinophile leucocytes, basophile leucocytes, lymphocytes, monocytes, and immature granulocytes. The proportion of segmented to non-segmented neutrophile leucocytes was estimated by first noting the number of each type during the ordinary 100 cell differential count and, on completion of this, differentiating an additional number of neutrophile leucocytes to bring the total of segmented *plus* non-segmented neutrophile cells to 100. The ratio was calculated from these numbers. A segmented neutrophile leucocyte was defined as one that had a nucleus with two or more lobes joined by a fine strand; the essential feature was the presence of a fine strand rather than the presence of lobes.

Statistical Methods.

The several series of counts were treated first as ordinary arithmetical series and the means and standard deviations were calculated.

The analyses were repeated with the use of a geometrical treatment in which the logarithms of the various counts were treated as arithmetical series. The means and standard deviations so obtained were finally reconverted into natural numbers for expression. It should be appreciated that the geometrical mean (mean_g) of a series of numbers will always be smaller than the arithmetical mean as the lower numbers have a relatively greater effect on the mean_g, and that the standard deviation and other indices of dispersion will be expressed as factorials (multiplied or divided by) rather than additives (*plus* or *minus*).

The observations on the ratios of segmented to non-segmented neutrophile leucocytes were treated as a geometrical series in accord with usual practice.

TABLE I.
Absolute Leucocyte Counts of Normal Male Adults: Statistical Means and Distributions.

Leucocytes.	Number of Counts.	Geometrical Analysis.		Arithmetical Analysis.	
		Mean _g per Cubic Millimetre.	Standard Deviation of the Series.	Mean per Cubic Millimetre.	Standard Deviation of the Series per Cubic Millimetre.
Total leucocytes	642	7,092 ¹	$\times 1.308$	7,372	$\pm 2,145$
Neutrophile cells	642	3,823	$\times 1.451$	4,104	$\pm 1,024$
Lymphocytes	642	2,510	$\times 1.385$	2,650	± 885
Monocytes	642	297	$\times 2.405$	377	(± 237)
Eosinophile cells	642	50	—	157	(± 156)
Basophile cells	642	4	—	28	—
Segmented neutrophile cells	515	3,208	$\times 1.555$	3,514	$\pm 1,526$
Non-segmented neutrophile cells	515	395	$\times 1.962$	510	± 374
Segmented/non-segmented neutrophile cell ratio	515	8.08	$\times 2.30$	—	—

¹ If a series of numbers is divided into several sub-series (that is, total leucocytes divided into the five series of the respective types of leucocytes) by an arithmetic process, then neither the sum nor the product of the individual mean_g will equal the mean_g of the whole series.

TABLE II.
Absolute Leucocyte Counts of Normal Male Adults: Statistical Distributions Compared with the Observed Distributions.

Leucocytes.	Number of Counts.	Method of Analysis.	Mean per Cubic Millimetre.	Ranges per Cubic Millimetre. ¹			Observed Limits of Series per Cubic Millimetre.	
				68% ±1 sigma.	95% ±2 sigma.	99.7% ±3 sigma.	Minimum.	Maximum.
Total	642	Geometrical	7,092	5,423-9,274	4,148-12,130	3,172-15,860		
		Arithmetical	7,372	5,227-9,517	3,082-11,662	937-13,807		
		Observed distribution		5,365-9,365	4,170-12,500	2,760-18,750	2,360	20,000
Neutrophile cells ..	642	Geometrical	3,823	2,634-5,550	1,815-8,056	1,250-11,690		
		Arithmetical	4,104	2,480-5,728	856-7,352	0-8,976		
		Observed distribution		2,665-5,445	1,750-8,250	1,000-12,750	802	13,320
Lymphocytes	642	Geometrical	2,510	1,812-3,467	1,308-4,818	891-6,674		
		Arithmetical	2,650	1,766-3,534	882-4,418	0-5,302		
		Observed distribution		1,790-3,470	1,017-4,656	875-5,875	798	6,500
Monocytes	642	Geometrical	297	124-714	51-1,718	21-4,130		
		Arithmetical	377	140-614	0-852	0-1,089		
		Observed distribution		170-587	57-930	0-1,800	0	2,000
Eosinophile cells ..	642	Geometrical	59	79-444	1-3,335	—		
		Arithmetical	157	0-313	0-469	0-626		
		Observed distribution		0-270	0-675	0-1,125	0	1,768
Basophile cells ..	642	Geometrical	—	—	—	—	0	272
		Arithmetical	—	—	—	—		
		Observed distribution		—	—	—		
Segmented neutrophile cells.	515	Geometrical	3,208	2,063-4,988	1,345-7,756	854-12,060		
		Arithmetical	3,514	1,988-5,040	462-6,566	0-8,092		
		Observed distribution		2,150-4,799	1,240-6,999	500-11,250	407	12,210
Non-segmented neutrophile cells.	515	Geometrical	395	201-774	103-1,519	52-2,981		
		Arithmetical	510	136-884	0-1,259	0-1,683		
		Observed distribution		196-790	73-1,583	55-2,375	45	2,450
Segmented / non-segmented neutrophile cells ratio.	515	Geometrical	8.08	3.5-18.6	1.5-42.7	0.68-98.3		
		Arithmetical		4.2-16.2	1.3-42.0	0.35-72.0	0.31	73.0
		Observed distribution						

¹ Underlined figures indicate those which most closely agree with the observed distributions.

The "observed" ranges of the different series of counts were obtained by subtracting an equal number of observations from each end of the series so that 68%, 95% or 99.7% of the total number of observations remained.

Analysis of Results.

Absolute Counts.

The means and other statistical results are set out in Tables I and II and Figure 1.

It was noted that the results of the geometrical treatment of the counts of the total leucocytes, neutrophile leucocytes,

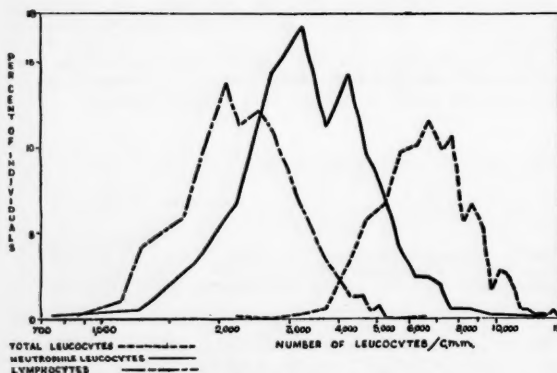


FIGURE 1.

Absolute leucocyte counts of normal adult males: Distribution of total leucocyte, neutrophile leucocyte and lymphocyte counts made on 642 individuals (semi-logarithmic scale).

lymphocytes, segmented and non-segmented neutrophile leucocytes agreed more closely with the observed distributions of the series than did the arithmetical results. In the instance of the monocytes the arithmetical treatment gave the closest fit, but it is doubtful if any simple statistical treatment of series of cells occurring in small numbers (monocytes, eosinophile leucocytes, and basophile leucocytes) is justified when only 100 cells are differentiated.

Segmented and non-segmented neutrophile leucocytes were differentiated and enumerated in only 515 volunteers, but there was no significant difference between the means and standard deviations of the total leucocytes and neutrophile leucocytes of this group of 515 and the whole series of 642 volunteers included in the other analyses.

Percentages.

The arithmetical means and other statistical results are set out in Table III.

The geometrical analyses are not recorded as the distributions were obviously arithmetical and the calculated ranges agreed with the observed ranges.

Immature leucocytes were recorded as being present in fourteen volunteers (2.2%); in twelve of these the immature cells amounted to 1%, and in two to 2% of the total leucocytes.

Discussion.

In Table IV some figures, on comparable material, published by some other observers have been set out for comparison with the figures published here.

The arithmetical means and 95% ranges of our absolute counts agree with those of Osgood *et alii* (1939) in America, but are considerably lower than those of Fairley (1923) in Melbourne and Simpson (1933) in London. The percentage distributions agree closely with those of Osgood *et alii* (1939) and Sturgis and Bethell (1943) in America and with those of Fairley (1923) in Melbourne, but differ from those of Simpson (1933) in London and Sweet (1924) in Brisbane. The essential difference between Sweet's figures and both those reported in this paper and those from the other authors quoted, is in the percentage of eosinophile leucocytes; he records 8.6 as the mean of 698 observations on 698 individuals. It seems probable that this difference was related to the staining of the films by Delafield's haematoxylin followed by eosin and to the circumstances that the films were collected during a hookworm and filaria survey in Queensland. It is stated that none of the subjects included in his series had evidence of either of these infestations, but many may have had infestations which were not apparent. We obtained no evidence of "tropical eosinophilia" at Cairns in the absence of some determinable cause other than climate. There is no obvious cause for the high neutrophile leucocyte percentage reported by Simpson.

TABLE III.
Percentage Leucocyte Counts of Normal Adult Males: Statistical Means and Distributions and Comparison of the Statistical with the Observed Distributions.

Leucocytes.	Number of Counts.	Statistical Analysis.		Method of Analysis.	Ranges. (Per Centum.)			Observed Limits of Series. (Per Centum.)	
		Mean per Centum.	Standard Deviation per Centum.		68.0%	95.0%	99.7%	Minimum.	Maximum.
					± 1 sigma.	± 2 sigma.	± 3 sigma.		
Neutrophile cells..	642	55.33	± 9.42	Statistical	45.9-64.8	36.5-74.2	27.1-83.6		
Lymphocytes ..	642	36.80	± 9.15	Observed distribution	45.2-64.0	36.7-74.8	28.0-81.0	27	84
Monocytes ..	642	5.24	± 2.80	Statistical	27.7-46.0	18.6-55.2	9.4-64.3		
				Observed distribution	27.5-46.4	18.3-55.6	15.0-62.0	13	64
Eosinophile cells	642	2.12		Statistical	2.4-8.0	0-10.8	0-13.6		
Basophile cells ..	642	0.38		Observed distribution	2.5-8.1	0-12.1	0-15.0	0	20
Segmented neutro- phile cells	515	48.04	± 10.38	Observed distribution	0-4.2	0-7.0	0-12.0	0	13
Non - segmented neutrophile cells	515	7.35	± 5.74	Observed distribution	0-0.6	0-2.8	0-3.0	0	4
				Statistical	37.7-58.4	27.3-68.8	16.9-79.2		
				Observed distribution	39.2-56.7	25.0-69.5	13.0-76.0	11	79
				Statistical	1.6-13.1	0-18.8	0-24.6		
				Observed distribution	3.4-10.2	1.0-24.5	1.0-49.0	1	52

It was not surprising to find that the series of neutrophile leucocyte, lymphocyte, segmented neutrophile, non-segmented neutrophile leucocyte, and, hence, the total leucocyte counts were distributed on a geometrical rather than an arithmetical basis. The arithmetical results did not agree nearly so closely with the observed distributions as did the geometrical results. The absolute numbers of leucocytes of all types may be regarded as inherent biological properties of the individual and thus, in a series of individuals, would be distributed like most other biological phenomena of a fundamental nature—on a geometrical or exponential basis rather than on an arithmetical basis.

The percentages of the various cells, on the other hand, represent the overall changes brought about by alterations, usually, of only one type of cell. The percentages are not fundamental biological properties of the individual and so would not necessarily be distributed geometrically. The results of the arithmetical treatment of our figures fitted the observed distributions very closely.

It was of interest to note that Osgood *et alii* (1939) recorded the distribution of the absolute number of

neutrophile leucocytes ("lobocytes") and lymphocytes as being "Skew", and that Sturgis and Bethell (1943) stated "the normal frequency or Gaussian curve is not strictly representative of the distribution of most cell values in the differential count".

Barnett (1933) and many others have pointed out that there is a large, and irreducible error inherent in the actual enumeration of cells in the differential count which amounts to about ±5% for cells occurring at about 50% of the total. It has also been calculated that a minimum of 400 cells should be differentiated for reasonable accuracy. In spite of this inherent error the 100 cell differential count remains the standard procedure in most hospitals and in physicians' laboratories unless there are special circumstances present. All the figures reported here (arithmetical treatment) agree closely with those of Osgood *et alii* (1939) based on 200 cell counts, and the percentages agree with those of Fairley (1923) based on counts of 600 cells.

The ratio of segmented to non-segmented neutrophile leucocytes was studied in considerable detail by T. S. Gregory at Cairns, particularly in reference to the changes

TABLE IV.
Percentage Leucocyte Counts: A Comparison of the Cairns Figures with some Figures Published by Other Observers.

Authors.	Number of Sub-jects.	Number of Ob-servations.	Total White Blood Cells.		Neutrophile Leucocytes.		Lymphocytes.		Monocytes.		Eosinophile Leucocytes.		Basophile Leucocytes.	
			Mean.	95% Range.	Mean.	95% Range.	Mean.	95% Range.	Mean.	95% Range.	Mean.	95% Range.	Mean.	95% Range.
Absolute Counts :														
Osgood <i>et alii</i> (1939), American ..	269	269	7,410	4,000-11,000	4,085	1,500-7,500	2,782	1,000-4,500	300	0-800	150	0-400	50	0-200
Simpson (1939), English	31	31	8,100		5,360		2,150		410		150		40	
Fairley (1923), Aus-tralian (Melbourne)	29	36	8,850		4,825		3,460		400		130		35	
Cairns (1946) (Arith-metical)	642	642	7,372	3,082-11,662	4,104	856-7,352	2,650	882-4,418	380	0-852	160	0-470	30	
Cairns (1946) (Geo-metrical)	642	642	7,092	4,148-12,130	3,823	1,815-8,056	2,510	1,308-4,818	300	51-1,718	60	1-3,355	4	
Percentage : Counts														
Osgood <i>et alii</i> (1939), American ..	269	269			54.3	33-75	37.7	15-60	4.0	0-9	2.0	0-6	0.5	0-2
Sturgis and Bethell (1943), American	24	2,100			56.88	45.11-68.65	37.03	25.07-48.90	3.64	1.99-5.29	2.01	0-4.06	0.44	0-0.08
Simpson (1939), English	31	31			65.4		27.2		4.8		1.9		0.5	
Fairley (1923), Aus-tralian (Melbourne)	29	36			54.5		39.1		4.5		1.5		0.4	
Sweet (1924), Aus-tralian (Brisbane)	698	698			52.0		33.0		6.0		8.6		0.3	
Cairns (1946), Arith-metical)	642	642			55.3	36.5-74.2	36.9	18.6-55.2	5.2	0-10.8	2.1		0.4	

in suppressed malaria. As few authors have reported either the absolute numbers or the ratios of these cells and as there is often little indication as to the exact meaning of the terms segmented and non-segmented neutrophil leucocyte, no comparisons have been made.

Conclusions.

The average absolute and differential leucocyte counts of the normal Australian male do not differ significantly from those reported from America.

Mean absolute leucocyte counts as usually reported are too high because the statistical treatment of the figures has been arithmetical.

A geometric analysis of a series of absolute leucocyte counts gives a better indication of the mean and of the distribution of the series about the mean, than does an arithmetical analysis.

The figures shown in Table V represent the normal smoothed means, and ranges for routine hospital and office leucocyte counts.

TABLE V.
Leucocyte Counts of Normal Male Adults: Smoothed Means and 95% Ranges.

	Absolute Number per Cubic Millimetre.		Percentages.	
	Mean ¹ .	95% Ranges.	Mean.	95% Ranges.
Total	7,100	4,100-12,100	—	—
Neutrophile cells	3,800	1,800-8,100	55	37-74
Lymphocytes	2,500	1,300-4,800	37	18-55
Monocytes	300	0-900	5	0-11
Eosinophile cells	60	0-500	2	0-7
Basophile cells	5	0-200	0.5	0-2
Segmented neutrophile cells	3,200	1,300-7,800	48	27-69
Non-segmented neutrophile cells	400	100-1,500	7	1-19
Segmented : non-segmented neutrophile cell ratio ..	8	1.5-43	—	—

¹ If a series of numbers is divided into several sub-series (that is, total leucocytes divided into the five series of the respective types of leucocytes) by an arithmetical process, then neither the sum nor the product of the individual means will not equal the mean of the whole series.

Summary.

1. An analysis of the total and differential leucocyte counts on 642 normal Australian males between the ages of eighteen and forty-nine years has been made.
2. The laboratory methods used corresponded with those in common use at hospitals and in physicians' clinical laboratories.
3. A geometrical analysis of the absolute counts proved more accurate than the usual arithmetical analysis.
4. Means and 95% ranges for the normal absolute and percentage leucocyte counts have been calculated and recorded.
5. A comparison has been made with some of the published figures, but no attempt has been made to survey the literature.

Acknowledgements.

The leucocyte counts analysed in this report were made by the staff of the pathology laboratory, Land Headquarters Medical Research Unit, Cairns, to whom the author is greatly indebted. Thanks are especially due to Major T. S. Gregory who was in charge of the laboratory for the majority of the time and who was responsible both for the excellence of the work and for allowing the author to include some data on the segmented:non-segmented neutrophil leucocyte ratios. The author has pleasure in acknowledging the frequent assistance and ready advice given on the statistical aspects by Miss Helen Newton Turner of the McMaster Animal Health Laboratory (Council for Scientific and Industrial Research), Sydney. The collection of this material was made whilst the author was Commanding Officer, Land Headquarters Medical Research Unit, Cairns.

Bibliography.

C. W. Barnett: "The Unavoidable Error in the Differential Count of the Leucocytes of the Blood", *The Journal of Clinical Investigation*, Volume XII, 1933, page 77.

K. D. Fairley: "The Leucocytes in Health and in Disease", *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume I, 1923, page 655.

T. S. Gregory: Unpublished data.

E. O. Osgood, I. E. Brownlee, M. W. Osgood and W. Cohen: "Total Differential and Absolute Leucocyte Counts and Sedimentation Rates. Determined for Healthy Persons Nineteen Years of Age and Over", *Archives of Internal Medicine*, Volume XIV, 1939, page 105.

R. H. Simpson: "Physiological Leucocyte Counts and the Detection of Small Deviations from the Normal", *The British Journal of Radiology*, Volume VI, 1933, page 705.

C. C. Sturgis and F. H. Bethell: "Quantitative and Qualitative Variations in Normal Leucocytes", *Physiological Reviews*, Volume XXIII, 1943, page 279.

W. C. Sweet: "Notes on the Differential White Blood Cell Percentages of Residents of Brisbane, Queensland", *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume II, 1924, page 1.

POST-OPERATIVE FLATULENCE OR "GAS" PAINS.

By V. J. KINSELLA,
Sydney.

THE theme of my recent paper on post-operative bowel management has recently been challenged, in a spirit of inquiry, by a junior colleague, an earnest seeker after truth. Although brought up in the old expulsive school, he has almost freed his mind of these primitive superstitions, but not quite. Post-operative flatulence still provides an intellectual difficulty, which he has expressed as follows:

After an abdominal operation patients suffer from abdominal pain due to flatus or gas in the intestine. Therefore, is it not rational to give aperients to drive out this gas? This advice is given in authoritative textbooks.

It must be regretfully admitted that such advice is still being printed and given out to students. (Even in that otherwise excellent and recently published "Clinical Handbook for Residents, Nurses and Students", edited by V. M. Coppleson, the model patient, admitted to hospital on page 1 for removal of the appendix, suffers from flatulence, which "may become troublesome and painful" at 4 p.m. on page 4—that is, on the day following operation. The treatment advised consists of drinks of hot water and peppermint, the passing of a rectal tube, a turpentine enema, and an aperient, "given as ordered" at 8 p.m.) To help others who, like my young friend, are still trying to free their minds from a few remaining rusty shackles, I shall set out a few facts.

1. "Flatulence" is an ancient term used by patients to describe a form of abdominal discomfort or pain, which, they tell us, is due to "wind" or "gas". Many clinicians are satisfied to accept this imaginary pathology fabricated by their patients. (In the same way, patients suffering from rectal discomfort or bleeding often announce that they are suffering from "piles", and the easily satisfied clinician prescribes a "pile" ointment without further thought.) But let us inquire further into the mechanism of "wind" or "gas" pains. They may have nothing to do with "gas".

2. It has been shown that the main source of gas in the alimentary tract is swallowed air. There is no need for me at present to set out the evidence for this. The amount of swallowed air may be increased by nervousness, by salivation, by the ingestion of foods containing air, such as bread, meringues and soufflés, by efforts to swallow a difficult bolus such as a stomach tube, by the continued presence of the stomach tube, and by the induction of anaesthesia. It is not likely that this swallowed air would cause pain, because the stomach is well fitted to accommodate considerable distension. It is part of its everyday work. Only by extreme measures, quite beyond clinical conditions, can the experimenter produce pain by gastric distension (Kinsella, 1928). Then again, gas in the alimentary tract tends to come into equilibrium with gas in the blood, and excess tends to disappear. This function of gas exchange may be interfered with by anything which interferes with the circulation in the bowel

wall, or by anything which damages the mucosa, such as laxatives (Taylor, Terry and Alvarez, 1922).

3. Paine, Carlson and Wangenstein (1933) experimented further. They set out to keep the alimentary tract free from gas by removing it at its source. To this end, they left in place a gastro-duodenal tube and used continuous suction. As might have been expected, they removed large quantities of gas. This proved of benefit to patients suffering from vomiting and distension. Thus, an indwelling tube, with suction, has now become an essential part of the treatment of patients with an element of obstruction. But these workers found this removal of gas to be of no value in the prevention or treatment of "gas" pains. They found also that when bowel actions were secured by a laxative, the discomfort of the patients was increased.

4. Mendes Ferreira, of the Mayo Clinic (1938), undertook a systematic investigation to find whether there was any evidence of an undue accumulation of gas in patients with post-operative "gas" pains. He took radiographs after operation in a large series of patients and found that post-operative "flatulence" was not due to an accumulation of gas.

5. The central and deep situation of these pains and their fluctuation suggest that they are caused by disordered and colicky contractions of the intestines. When operating under local anaesthesia I have witnessed the onset of these pains. Each pain was accompanied by powerful contractions of the intestine, even the caecum becoming deeply haustrated.

6. The most potent factor causing this irritable behaviour of the intestines is the intestinal irritants administered by the surgeon (or by the nurses) before or after operation. These irritants include castor oil given by mouth, or turpentine and soap given by rectum. (In the "Clinical Handbook for Residents, Nurses and Students", our model patient received all three.) If patients are divided into two series, and if pre-operative "bowel treatment" is given to the first series and not to the second, it is found that post-operative "gas" pains are greatly reduced in the second series (Harris, 1905; Walker, 1906; Moore, 1908; Quain, 1912; Bloodgood, 1913; Crile, 1914; Peet, 1918; Emge, 1918; Wilensky, 1920; Taylor, Terry and Alvarez, 1922). It appears that after operation, traces of the pre-operative irritants still linger. When the intestines recover from the prolonged flaccid paralysis induced by general anaesthesia (at 4 p.m. on the second day, in the case of our model patient), the irritant is able to resume its game of colic production.

7. As the patient's post-operative comfort can be improved by omitting the pre-operative purge, so also, *a fortiori*, it may be further improved by omitting the post-operative purge. Try it; but do not forget that the diet must be appropriately modified, and the psychology of patient, relatives and nursing staff taken into account. Minds must be set at rest, as well as bowels. Practitioners who have previously used the routine pre-operative and post-operative aperients, and who now try this gentler method, will observe a comfort and security hitherto unknown to them. The added security is strikingly illustrated by a study of the literature of appendicitis in the first decade of this century. Only those surgeons got good results who, like Deaver, Murphy and Ochsner, described in detail a gentle after-treatment. The others got very bad results, such as Barnard's 5% to 10% mortality rate among patients coming to operation in less than twenty-four hours, and Makins's 16% mortality rate among patients coming to operation in less than forty-eight hours. What else could they expect? After appendicectomy, part of the bowel—the ileo-caecal loop—becomes less efficient in propulsion. It is functionally, if not actually, narrowed. If there is a mere trickle passing down from above, obstruction need not result. But if the trickle is turned into a torrent by aperients, the potential obstruction is turned into an actual obstruction. All the grim paraphernalia of stomach tube and intravenous fluid administration then becomes necessary. The intestinal mucous membrane has been so irritated that it becomes an excreting instead of a predominantly absorptive surface.

Surgeons have long since condemned the use of aperients in acute appendicitis. But all the arguments against the aperient in acute appendicitis are equally valid after appendicectomy, and it is high time that the post-operative use of the aperient shared the stigma of malpractice.

Alvarez wrote as follows:

One of the most remarkable evidences of lack of cerebration on the part of physicians and nurses is to be found in the way in which, during severe illnesses and after operations, they usually demand, and insist on getting, faeces from patients, who for days haven't had anything to eat!

Or who have had, at most, a very little non-residue diet.

I think that my young friend should now see the answer to his question. He must at least suspect that the effort to expel imaginary "gas" by rough methods, and to drive it violently past the wounded segment of bowel, is not only irrational but positively dangerous, and likely to aggravate the condition which it has been designed to cure.

These pains, which may occur occasionally in spite of our best efforts, should be treated, if severe, by heat (for example, the hot air cradle), by morphine and atropine, or by pethidine. But they are better prevented, by gentle pre-operative, operative and post-operative treatment. Non-residue feeding before and after operation is the secret. This means, in brief, the avoidance of milk, fruit and all vegetable roughage. If the rectum is loaded and the surgeon has good reason to fear faecal impaction, the rectum should be emptied by a natural motion, or, in rare cases, by a glycerin suppository two days before operation. The bowel is then kept empty by strict adherence to the non-residue diet. The watchword during the actual operation is: "Cherish the endothelium." Remember, this defensive layer is in structure more delicate than the conjunctiva.

THE ADMINISTRATION OF NEBULIZED SOLUTIONS OF PENICILLIN.

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DURING the last two years, numerous reports have appeared in the medical journals of Great Britain and America on the use of nebulized solutions of penicillin.⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾ The results obtained have differed greatly, some workers claiming success in the treatment of a wide range of pulmonary and nasal diseases, and others stating that the benefits from the administrations have been slight and unpredictable. In many cases the satisfactory results have been obtained in America, and if the reports are examined critically, it will be found that where the subject has been approached with an appreciation of the physical problems involved, then certain pathological states have been relieved by this form of therapy.

Until recently, nebulizers have been used in medicine to administer drugs which act as vasoconstrictors and as bronchodilators. Adrenaline, ephedrine and "Neo-Synephrine" solutions have been sprayed into the nasal passages and throat to reduce inflammatory and allergic swelling. For such purposes simple hand atomizers have been satisfactory, as these appliances will carry the therapeutic substance to the desired areas. With the introduction of the treatment of bronchial asthma by the inhalation of concentrated solutions of adrenaline and ephedrine, it became apparent that more efficient nebulizers were needed if these drugs were to be carried to the bronchi. Much work was done on the design of suitable equipment and the essential features were determined by experiment.⁽⁶⁾⁽⁷⁾ It was shown that the factors governing the distribution of a nebulized liquid were the molecular size of the dissolved substance and the diameter of the particle delivered by the nebulizer.⁽⁸⁾ The larger the molecule and the smaller the particle, the wider will be

the distribution of the substance before deposition takes place. Since in the case of therapeutic preparations the molecular size is fixed, the important factor is the diameter of the particle, and it was proved that with substances such as adrenaline the diameter should not exceed 1.5μ . For satisfactory distribution of penicillin to the bronchi and alveoli in the human subject, the particle of solution delivered by the nebulizer should not be greater than 1.0μ in diameter.⁽⁶⁾ Many of the adverse reports would appear to be due to the neglect of this fundamental fact, the nebulizers described being little better than scent sprays and entirely unsuitable for the administration of penicillin.⁽⁶⁾

With the introduction of drugs that were therapeutically active against various organisms producing pulmonary diseases, attempts were made to treat these diseases by the inhalation of nebulized solutions. Thus in 1943 Stacey⁽⁷⁾ reported on the use of nebulized solutions of sulphonamides in the treatment of bronchiectasis, and in 1944 Edlin⁽⁸⁾ recorded the use of promin inhalation in the treatment of pulmonary tuberculosis. With the introduction of penicillin, the use of inhalation therapy received considerable attention, as this drug in saline solution was non-irritant to the pulmonary tissues. In 1944 Bryson,⁽⁹⁾ and in 1945 Barach,⁽¹⁰⁾ Vermilye⁽¹¹⁾ and Olsen,⁽¹²⁾ reported extensively on the use of nebulized solutions in a great variety of pathological states. It was shown that not only could adequate concentration be obtained locally to combat the organisms commonly encountered in pulmonary disease, but high and sustained blood levels were possible. The wide adoption of the method, particularly in Great Britain, was prevented by the relatively high dosage required.

In many pulmonary conditions, such as lung abscess and bronchiectasis, the parenteral administration of penicillin proved unsatisfactory, and often it was found impossible to produce a therapeutic concentration in the sputum by this method of attack. The administration of penicillin by inhalation, provided the administration was efficient, would in many cases produce the desired level. Olsen⁽¹²⁾ in 1945 reported the use of nebulized penicillin in the pre-operative and post-operative treatment of bronchiectasis, and after the return of Dr. C. J. Officer Brown from America in January, 1946, the routine use of this method was instituted at the Alfred Hospital, Melbourne. The first problem was to obtain a supply of efficient nebulizers, as there was a prohibition on the importation of such equipment into Australia. Through the kindness of Dr. C. Sutherland, a "Vaponefrin" nebulizer as recommended by Barach⁽¹⁰⁾ and by Olsen⁽¹²⁾ was made available, and a firm of precision glass blowers was found which was willing to undertake the manufacture at a reasonable cost.

The internal construction of this nebulizer is represented in Figure I. Oxygen or "Carbogen" at a measured rate of flow is admitted at A and passes through a fine jet (B) which projects it across the upper end of a fine tube (C), the lower end of which dips into the penicillin solution. The jet of oxygen passing across the vertical tube acts as a Venturi system, drawing the penicillin solution up and projecting it forward as a mixture of oxygen and droplet particles. These particles vary greatly in diameter, and many of them are too coarse to be of value in the treatment of pulmonary conditions. Accordingly the jet is directed against a glass target (D), where the large particles are deposited, and the solution runs back into the penicillin pool at the bottom of the nebulizer. The fine particles are carried past the target and out through the mouthpiece (E), to be inhaled by the patient. The rush of oxygen from the jet B, emerging from the mouthpiece E, produces a negative pressure at the orifice F, so that air is injected into the nebulizer through this orifice. This increases the volume of gas passing through the nebulizer per minute, and hence raises the velocity of the particles of solution. The dispersion of the penicillin to the lungs is aided and a saving in oxygen results. If the same velocity was imparted to the particles by closure of the orifice F and by an increase in the rate of flow of oxygen, then the amount of penicillin solution nebulized per minute would become uneconomical. By means of this nebulizer, one millilitre of solution will be nebulized per ten minutes

when the oxygen is flowing at a rate of approximately six litres per minute.

Apart from the physical properties of the nebulizers, certain other facts are important if penicillin nebulization is to be successful. It has been shown by Herrell⁽¹³⁾ that for penicillin to exercise a bactericidal effect, it must be in contact with the organism continuously for four to six hours. Since it would be impossible for the patient to use the apparatus during a four-hour period, some compromise is necessary. Olsen⁽¹²⁾ alternated ten-minute periods of nebulization with ten minutes of rest, and continued the treatment for ten hours in each day of treatment. Since the penicillin remains in the sputum for some time after the cessation of nebulization, he maintained an effective concentration for ten hours each day. Two routine methods have been adopted at the Alfred Hospital. At first the patient was given three millilitres of solution per hour for eight hours each day. This volume of solution required the use of the nebulizer for twenty-five to thirty minutes in each hour, with a flow of six litres per minute through the nebulizer. Some patients found the time

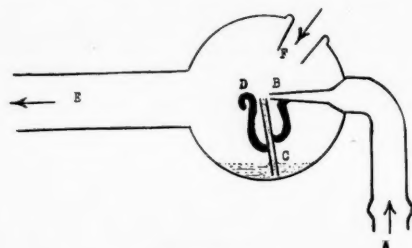


FIGURE I.

A: Oxygen inlet; B: oxygen jet; C: penicillin intake tube; D: glass target; E: mouthpiece; F: air injector aperture.

long and attempted to shorten it by increasing the rate of flow. It was found with this routine that the sputum expectorated at the end of a rest period was still deeply stained with penicillin. Recently the patients have been given three millilitres per hour, but have been instructed to use the nebulizer for ten minutes and then rest for an equal period, continuing thus until the penicillin solution is exhausted. On theoretical grounds the latter method would appear to be preferable; but no obvious difference has been observed in the two methods with regard to clinical improvement. The solution of penicillin that has been used throughout contains 5,000 Oxford units per millilitre of normal saline solution. Since the average treatment uses three millilitres per hour for eight hours each day, the daily dosage of penicillin is 120,000 Oxford units.

Since the therapy must be maintained for eight to ten hours a day, it is obvious that any form of manual operation is out of the question. A cylinder of oxygen or "Carbogen" fitted with a regulator and flowmeter capable of reading to fifteen litres per minute is used as the source of motive power (Figure II). At the Alfred Hospital it has been the practice to use 5% "Carbogen" (5% carbon dioxide in oxygen), as it was held that the raised alveolar concentration of carbon dioxide increased the pulmonary ventilation and aided in carrying the penicillin to the alveoli. In order to avoid waste of penicillin solution, a Y-piece is connected between the "Carbogen" cylinder and the nebulizer, one limb of the Y-piece being left open. The patient places a finger over this opening during inhalation and removes it during exhalation. In this way nebulization occurs only during inhalation, and the "Carbogen" escapes through the Y-piece during exhalation. Holding the end of the nebulizer in the mouth, the patient breathes deeply and holds the breath for a second or two at the end of inspiration. The pause at the end of inspiration ensures more efficient deposition of the penicillin in the bronchi and alveoli. The patient exhales through the nose, and in this way a considerable quantity of the drug is carried to the nasal passages.

In the thoracic surgical unit at the Alfred Hospital, most of the patients treated by penicillin nebulization have suffered from bronchiectasis or lung abscess. Bronchiectasis, when such a patient is admitted to the unit, is a surgical disease, and the use of penicillin nebulization has been restricted to the treatment of the patients prior to operation and in the immediate post-operative period. It has been found that the optimum benefit is obtained in these cases from seven to ten days' treatment before operation. If considerable improvement has not occurred in that time, it is not reasonable to delay operation. In most cases of bronchiectasis there is a marked improvement in the nature of the secretions, even if the volume is not greatly reduced. The odour vanishes and the secretions change from purulent to mucopurulent or even mucoid. In the favourable cases, the volume falls from 150 millilitres to 30 millilitres of mucus per day. In addition, when there is an associated upper respiratory infection, the nasal discharge is much lessened. The difficulties of the anaesthetist during operation are greatly reduced by the reduction in volume of the pulmonary secretions. Partly because the penicillin improves pul-

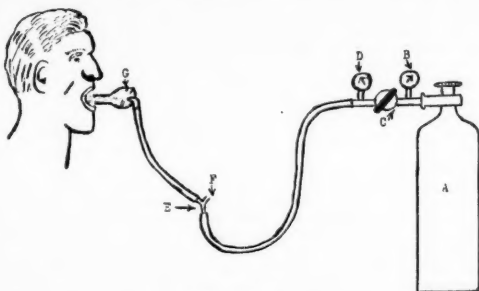


FIGURE II.

A: Cylinder of oxygen; B: cylinder contents gauge; C: regulator; D: dial flowmeter; E: Y-piece; F: finger control; G: nebulizer.

monary function, but possibly largely owing to the intense course of breathing exercises that the treatment involves, the vital capacity of the patient rises. This is a further advantage from the viewpoint of the anaesthetist. The symptomatic improvement obtained by the administration of nebulized penicillin to the bronchiectatic patient is not considered in any way curative. If the nebulization is stopped, the patient relapses to the previous state within a few weeks.

This fact was demonstrated forcibly in the case of a patient who inhaled a tooth from his denture whilst unconscious after a motor-car accident. The patient developed a cough with foul sputum during his convalescence, and as the tooth was not radio-opaque, it was not recognized by his medical attendant. The patient was referred to the thoracic unit with a diagnosis of bronchiectasis. Further radiological investigation revealed the presence of a foreign body, which was removed from the orifice of the middle lobe bronchus six weeks after its inhalation. A bronchogram taken after the removal of the tooth revealed dilatation and bronchiectasis of the lower and middle lobe bronchi, with atelectasis in the lower lobe. The patient was given an intensive course of penicillin both by injection and by nebulization, after which the amount of secretion fell to ten millilitres per day. The patient was discharged from hospital and returned to the country; but he returned within three weeks with copious foul sputum, and a further bronchogram showed that no reduction in the bronchiectasis had taken place. A further course of penicillin reduced the secretions, but produced no improvement in the radiological picture. The lower and middle lobes were resected and the condition was cured. Though penicillin arrested the secretions, it did not cure the underlying pathological process which had been present for only a few weeks.

In cases of lung abscess, the use of penicillin has been disappointing. Here the infection is present in cavities surrounded by consolidated lung tissue. The penicillin is unable to reach the infected areas, either from the blood

stream or from the bronchial tree, and little reduction in the volume of sputum is obtained. The use of penicillin in these cases is in the prevention of spread of the infective processes to areas of lung not originally involved by the abscess formation. Secretions which spill from the cavities to healthy lung tissue receive a concentration of penicillin adequate to render them innocuous.

After lobectomy or pneumonectomy, penicillin can be administered by nebulization. Usually the patient finds it difficult to handle the nebulizer during the first twenty-four hours after operation; but after that time treatment can be recommenced. At present experiments are being conducted with a view to feeding the nebulized penicillin into the oxygen supply of the patient in the post-operative period. Scarcity of satisfactory oxygen therapy masks has hindered the use of this method, which has become firmly established in North America. By this means penicillin nebulization treatment can be maintained throughout the whole twenty-four hours without any inconvenience or distress to the patient.

Penicillin nebulization is not considered a substitute for other methods of treatment for patients suffering from suppurative diseases of the lungs. In the pre-operative treatment of bronchiectasis, postural drainage is still used. However, once the diagnosis has been made and the bronchograms have been taken, no further bronchoscopic aspirations are considered necessary. The combination of postural drainage and penicillin nebulization is sufficient to bring the patient to the optimum condition for operation.

In the thoracic surgical unit at the Alfred Hospital, no large-scale investigation of non-surgical conditions has been attempted. From a limited experience it is thought that such conditions as broncho-sinusitis in children, when no bronchiectasis can be demonstrated, are relieved by the administration of nebulized penicillin over a period of two to three weeks. Since these conditions respond poorly to most available forms of treatment, it would appear justifiable to give these children periodic courses of nebulization. No difficulty has been experienced in training children down to the age of five years in the use of the nebulizer provided that an older child is available to manipulate the Y-piece. Usually it is beyond the ability of the small child to synchronize the movement of the finger with the respiration. In the children's ward, the older patients, when convalescent, look upon it as a pastime to help with the treatment of the younger patients.

Conclusion.

The essential factors for treatment of patients with nebulized solutions of penicillin are discussed. The construction of an efficient nebulizer is illustrated and the method of use detailed. The penicillin dosage and the length of treatment are stated. The results obtained in cases of bronchiectasis and lung abscess are set out, and suggestions are made for the treatment of non-surgical conditions.

Acknowledgement.

I wish to thank Dr. C. Sutherland for his valuable advice in regard to nebulizers and for his help in persuading the Precision Glass Instrument Company to manufacture the equipment in adequate numbers. I wish also to acknowledge the freedom of action which Dr. C. J. Officer Brown has granted me in dealing with the patients who form the basis of this paper.

References.

- V. Bryson, E. Sansome and S. Laskin: "Aerosolization of Penicillin Solutions", *Science*, Volume C, July 14, 1944, page 33.
- A. L. Barach, F. H. Silberstein, E. T. Oppenheimer, T. Hunter and M. Soroka: "Inhalation of Penicillin Aerosol in Patients with Bronchial Asthma, Chronic Bronchitis, Bronchiectasis and Lung Abscess: Preliminary Report", *Annals of Internal Medicine*, Volume XXII, April, 1945, page 485.
- A. M. Olsen: "Nebulized Penicillin: Preliminary Report of its Role in the Management of Surgical Bronchiectasis", *Proceedings of the Staff Meetings of the Mayo Clinic*, Volume XX, June 13, 1945, page 184.
- H. N. Vermilye: "Aerosol Penicillin in General Practice", *The Journal of the American Medical Association*, Volume CXXIX, 1945, page 251.
- L. Capper: "A New Penicillin Inhaler", *British Medical Journal*, September 21, 1946, page 422.

(*) J. W. Stacey: "The Inhalation of Nebulized Solutions of Sulfonamides in the Treatment of Bronchiectasis", *Diseases of the Chest*, Volume IX, July-August, 1943, page 302.

(*) J. S. Edlin, I. D. Bohrowitz, F. K. Safford, Junior, and F. S. Butler: "Promin Inhalation Therapy in Pulmonary Tuberculosis", *American Review of Tuberculosis*, Volume I, December, 1944, page 643.

(*) C. N. Davies: "Filtration of Droplets in the Nose of the Rabbit", *Proceedings of the Royal Society, Series B*, Volume CXXX, August, 1946, page 382.

(*) W. E. Herrell: "Penicillin and Other Antibiotic Agents", 1946, page 35.

Reports of Cases.

HERNIA IN THE RIGHT ILIAC FOSSA.

By J. C. BELL ALLEN, F.R.C.S. (England),
Sydney.

THE following case is considered worth recording in view of its unusual features. In the available literature no record of a similar condition has been traced.

Clinical Record.

E.W.R., a male patient, aged fifty years, following the occupation of a ganger, consulted me concerning a swelling in his right side, which he stated had been present for about twelve months; at the time of its appearance he had had a severe cough, and during a coughing paroxysm he had felt a swelling appear. He complained of discomfort and soreness, particularly after work, and had found that he was able to reduce the swelling by pressure and that this reduction was accompanied by a "gurgling" sensation.

On examination the man was well developed and somewhat obese. Slightly below the level of the anterior superior iliac spine a swelling was present in the right iliac fossa, lying about one and a half inches medial to the spine on this side. The swelling was about two inches in length by about one and a quarter inches across, with its long axis running downwards and medially. It was readily reducible and disappeared when the patient lay down. A distinct impulse was present on coughing. No hernia was detected in either inguinal region.

At operation an incision was made over the swelling down to the external oblique fascia, which was found to be intact. These fibres were separated along the line of their direction, and a sac became evident going through an opening in the internal oblique and transversus muscles, its neck being about one inch in width. The sac contained small bowel, which was returned to the abdomen, and the sac was opened. The peritoneum at the neck was oversewn and the margins were isolated by dissection and found to consist of an opening by separation of the fibres of the transversus and internal oblique muscles. These muscles were sutured in separate layers and the remainder of the wound was closed.

The patient was allowed up the following day and made an uninterrupted convalescence, repair being satisfactory.

Comment.

A satisfactory explanation for a hernia in this situation is difficult to visualize. The history given, about which the patient was quite certain—namely, the sudden onset of the swelling during a paroxysm of coughing—seems to indicate that an area in the abdominal musculature, weakened probably as a result of fat infiltration between the muscle fibres, was unable to withstand the increased intraabdominal pressure and allowed the abdominal contents to protrude. This hypothesis is possibly supported by the fact that the external oblique overlying the site of the hernia was fascial and consequently had not suffered the same fat infiltration as had occurred between the muscle fibres of the internal oblique and the transversus. Once herniation had been established, progressive enlargement occurred with the formation of a sac. Closing

of the peritoneum and approximation of the muscle fibres by suture are apparently all that is required for a satisfactory repair.

Reviews.

RADIOGRAPHY OF THE CHEST.

STILL another of the series of handbooks on radiology has been received from the publishers; it is entitled "The Chest", and George G. Rigler is the author.¹ It is a compact, well-arranged book of handy size, and follows the atlas method of presentation of the subject. For the sake of brevity, only the most salient features of the various conditions are given, while fitting illustrations of remarkable clarity are given on the opposite side of the text. The author gives a very good description of the various methods of examination, by both fluoroscopy and radiography. He rightly lays particular stress on the need for adequate visual accommodation before proceeding to screen examination.

Under "technique" there is a discussion on the various sizes of films used. A 72 inch distance with fine focus rotating anode tube and with the use of moderate kilovoltages and milliamperages at from one-twentieth to one-tenth of a second is recommended, while with the four inch by five inch films 200 milliamperes at 90 kilovolts peak for one-fifth of a second at forty inches distance are used. The miniature methods are considered valuable for mass surveys of healthy individuals with check-up in doubtful cases by conventional methods. It is pleasing to see that the author does not recommend the use of miniature radiography in surveys of workers who are liable to have minor degrees of silicosis.

Under the section on normal appearances there are two unusually good reproductions of postero-anterior and lateral views with superimposed drawings, showing the various intrathoracic structures. The appearances due to artefacts and superimposed normal shadows are also shown clearly.

The author deals at some length with respiratory physiology and points out the differences when films are taken in deep inspiration and deep expiration.

Intrapulmonary pressure is generally negative, and changes in emphysema and atelectasis cause a shift of the mediastinal contents to the affected side while the diaphragm tends to rise, because of the difference between intrathoracic and intraabdominal pressure. There follows a more detailed description of the pathological processes met with in the lungs and opposite each descriptive paragraph there are illustrations of the subject matter. Pneumonia and infarcts and pneumonitis are profusely illustrated. Tuberculosis and pneumonokoniosis are described along conventional lines.

Post-operative appearances not usually seen in textbook descriptions are included, and this is a valuable addition to the literature.

Altogether, this is a very good production and the illustrations are far ahead of any seen previously in works of this type.

POST-GRADUATE LECTURES IN MEDICINE.

A THIRD volume of post-graduate lectures in medicine has been published in Edinburgh.² The post-graduate committee which was responsible for lectures in Edinburgh for forty years was recently replaced by an official Post-Graduate Board under the direct aegis of the University of Edinburgh and the Royal Colleges of Physicians and Surgeons. Apparently the publication of lectures will continue under the new arrangement, because a fourth volume is in type and will soon appear. The present volume, which is produced in Oliver and Boyd's best style, contains thirty-two lectures by many authors and dealing with a variety of subjects. Charles Cameron writes on the differential diagnosis of chronic affections of the lungs; Harold Scarborough writes on vitamins in relation to hæmorrhage; Ruth Pybus on the protective diet; I. Simson Hall on middle ear deafness; T. N. McGregor on the uses and abuses of the female sex hormone; David Band on urogenital tuberculosis; W. F. T. Haultain on oestrogenic therapy; and so on. This is a useful book and not unduly expensive.

¹ "The Chest: A Handbook of Roentgen Diagnosis", by Leo G. Rigler, M.D., 1946. Chicago: The Year Book Publishers Incorporated. 8" x 5½", pp. 352, with many illustrations. Price: 52s.

² "Edinburgh Post-Graduate Lectures in Medicine", Volume III, 1946. Edinburgh, London: Oliver and Boyd. 9" x 6", pp. 606, with illustrations. Price: 15s.

The Medical Journal of Australia

SATURDAY APRIL 26, 1947.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

A BLANKET OF IGNORANCE AND ITS REMOVAL.

LAST year in a discussion in these pages on the international medical conference that was to be held in London in September at the invitation of the British Medical Association on behalf of the *Association professionnelle internationale des médecins* reference was made to the urgent need today for understanding and goodwill among the nations. The idea was that a new organization should be formed, and the projected activities of this organization included (a) the promotion of closer ties among the different national medical organizations, and (b) the encouragement of better international relations generally, by professional contact and otherwise. (An account of the conference and of the formation of the new organization was published recently in this journal in a letter from the Federal Council's representative.) Several ways in which the seeds of national tolerance and understanding could be sown were mentioned in our discussion. These included first of all the establishment of research fellowships in research institutes of different countries to which suitable graduates from other places might be appointed, and secondly, an interchange for certain periods of medical officers from the teaching hospitals of different countries. It is too early for any steps of this kind to be taken by the new organization, but the ideas that have been put forward should be kept alive. An opportunity to do this arises with the publication of an address by the Chancellor of the University of Melbourne, Mr. Justice Lowe, in the *University Gazette* of March 6, 1947.

Mr. Justice Lowe has for some time had in mind plans for the exchange of students between different countries. At the "commencement" of the University of Melbourne in 1945, in discussing the main causes of international understanding, he said that one of the greatest had been the ignorance by the people of one country of the ways of life and of thought of another. He said that in spite of all the improvements during recent years in the means of disseminating knowledge, the general ignorance in Australia of conditions in the other parts of the Empire and in the United States of America was appalling. He

thought that the ignorance in those countries of Australian conditions was no less appalling. Australian leaders looked in the post-war world to a continuation and a development of the cooperation which had been so fruitful during the war between the different parts of the Empire and the United States. The Chancellor imagined that there were few who would disagree with this policy, but he regarded it as certain that its effectiveness would be marred and its future menaced unless the "area of ignorance" was constantly reduced. It was here that he thought that the universities could play an important and, as the years passed, a decisive part. The Chancellor quite rightly was not concerned with the details of any plan so much as with the general acceptance of the idea. In the present address he states that the Vice-Chancellors' Committee (of Australian universities) has reported favourably on the proposal. He also tells us that in order to bring the matter to the attention of the Commonwealth authorities he sent a copy of what he had written to the Minister for Post-War Reconstruction.

Anyone who has attempted to promulgate a new idea, no matter how much benefit the idea when put into practice is likely to confer on the whole community, knows how inattentive, absent minded and even wilfully deaf those in authority can be. This is true of men in all walks of life; it is true of social and economic spheres as well as of political circles. It is the ability to see ahead and the willingness to plan for the future with disinterested zeal that distinguish the statesman from the politician. And we all know, or should know, that there are statesmen and politicians in all spheres of communal activity. We have known both types of individual in medical circles and shall continue to meet them; and the "august chancellor" of every Australian university could make the same kind of statement if he was called upon for an opinion. We can conceive of circumstances in which men with statesmanlike instincts are prevented by pressure of work from giving effect to new ideas which they know call for action; but, being statesmen, they will not be put off indefinitely and will make an opportunity to set the right machinery going. The Chancellor of the University of Melbourne has claimed the attention of various persons overseas. Both *The Times*, of London, and the *New York Times* gave prominence to his views; the Press of Ottawa, Toronto and Vancouver gave them publicity, and one paper observed that "it seems too good an idea to let die". The High Commissioner for Canada was so interested that he sent a copy of the proposal to the Canadian Universities Association—he felt sure that organization would look with favour on it. Mr. A. H. Sulzberger, of the *New York Times*, sent the proposal for comment to Dr. Stephan Duggan, Director of the Institute of International Education, "only to find that his Institute was working on a similar scheme to interchange students from the Universities of different countries". Our Melbourne Chancellor points out that there is a wealth of material in support of the essential soundness of the idea outlined in his proposals. (We have not mentioned all the references cited by him.) He adds that his ideas can take shape on a national basis only with the aid of the Commonwealth. Despite all the encouragement afforded by the comments in other parts of the world and the steps that were contemplated in one or two other centres, the only encouragement he has received from the

Commonwealth has been a letter from the Minister for Post-War Reconstruction asking him to furnish details of his proposals. This is something, though not much. Perhaps we should be charitable and conclude that Commonwealth ministers have been preoccupied with matters that appear to be of more serious moment. A bright spot that appears on the horizon is described by the Chancellor, who tells us that the newly arrived Ambassador from the United States has in no uncertain terms commended the idea of exchanging students between Australia and the United States, "and not merely students but also teachers and research workers"—covering the field suggested by this journal last year.

There is no reason to despair in this matter. The ideas are so essentially sound and are likely in the course of a few years to have such far-reaching results that they cannot be permanently ignored. Our Melbourne Chancellor points out that the cost would not be excessive. For example, he estimates that thirty students could be sent each year to the United States for £15,000. He has deplored the "blanket of ignorance" between the peoples of different countries. What should be attempted at present is to dispel the ignorance of the people of the Commonwealth about the means that can be used to remove what we may call the international blanket. It is to be hoped that the Chancellor will continue to proclaim his ideas and beliefs. Others whose voices can be raised should not allow him to remain like a "voice crying in the wilderness". The Federal Council of the British Medical Association in Australia might well make common cause with him; the proposals, particularly as they affect students of medicine, teachers of medicine and research workers, come within its sphere of action.

Current Comment.

THE ALMONER AND THE PHYSICALLY HANDICAPPED CHILD.

THE work of the hospital almoner and social worker has in the past not received the attention in this country that it merits. Latterly the numbers undertaking training in this field have increased and the demand for their services has also grown, though only a vague idea of the aims of their work is held by many medical practitioners and others who should be vitally concerned. The difficulties of the crippled child and adolescent are, on the other hand, only too well known. It seems worth while, therefore, to comment on an interesting document received from the Almoner's Department of Sydney Hospital: "Report of a Survey of Patients under 21 Attending the Orthopaedic Clinic of Sydney Hospital during 1945." A review has been made of the almoner's records of 146 children and adolescents attending Sydney Hospital during 1945 and 1946, all of whom had orthopaedic disabilities such as would interfere with their taking a normal place in society. Consideration is first given to the more obvious aspect of the almoner's task, the provision of "services ancillary to medical care" such as arrangement for surgical appliances and encouragement in the wearing of them, help in obtaining transport, financial assistance, installation in convalescent homes and similar institutions, and instruction in handwork and other recreational occupations. These needs seem to have been met satisfactorily and call for no comment. The second aspect, education, has apparently not received the same attention, and regret is expressed in the report at the relative paucity of information in the records regarding the patients'

schooling. Examples are quoted, however, of individuals of average intelligence who had quite unsatisfactory school records attributable to their disabilities. Handled without understanding, they responded much below their true ability, and were mistakenly classed as mentally deficient or irresponsible. Those of low average or below average intelligence suffered most by their loss of time at school. Up to the age of eleven years the effects were less marked as school standards were less exacting. Beyond that age the pressure was greater and the consequent sense of inadequacy was increased, often with serious repercussions on the personality. Children of higher ability tended to distinguish themselves as they naturally had more time and inclination to study than their physically active school fellows; the parents of all such children, however, had educational qualifications above the average. It is felt that a great deal can be done by almoners in early investigation of schooling difficulties and guidance in meeting them. Grave personality problems of adolescence may thus be averted. Similarly, early investigation and advice are needed in matters of vocational guidance and employment. The importance of satisfactory employment is rightly stressed, satisfactory employment being defined as "work which has relative permanency, is able to give interest and a sense of satisfaction to the worker, and is commensurate with his physical and mental ability". Some patients had undertaken training or accepted positions which were not suitable to their ability, with unsatisfactory results; others had found the difficulties of open competition in the labour market too great; others again had been confused by conflicting advice and assistance from different social agencies. In the solution of these problems, the report emphasizes the importance of vocational guidance and intelligence tests, followed by discussion with an experienced almoner, and continued supervision during the trial of suitable employment. In addition, to meet difficulties of competition, which are especially great when to physical disability is added a low mentality, some form of sheltered workshop or government subsidy of private workshops is recommended.

The final and most important aspect discussed is that of emotional adjustment. A number of factors are concerned in this. The most obvious is the effect of long periods in hospital with absence from school and separation from real life. Apart from missing school, the child in the circumscribed world of a hospital ward fails to learn the multitude of things about ordinary life and society which the normal active child is absorbing so rapidly. His part in active play and group experience is limited. The members of his own family are relative strangers who visit him and frequently over-indulge him. The subsequent return to home and everyday life is often too much for him and he may fail completely to adjust himself. He feels ignorant, inexperienced and inferior, and frequently resents failure to receive at home or at school the individual attention and consideration to which he has become used in hospital. For this attitude he can scarcely be blamed. The second factor is the wearing of surgical appliances, a trying experience, especially for the adolescent who is developing the desire to be like other people and to present an attractive appearance. The number of people concerned with the patient—doctors, nurses, physiotherapists, occupational therapists, almoners, representatives of societies, welfare workers—tends to disrupt the privacy and normal development of his life. Finally, he has many problems in relation to society in general: debarred from active sport, he fails to find satisfaction and full self-expression in the physical sphere; growing older and contemplating prospects of marriage, the boy may worry about his ability to support a family, the girl about her physical capacity for child-bearing, their prospects of successful activity being limited, the question of succeeding at school or in a particular selected job assumes excessive importance and failure may have a devastating effect. These situations are illustrated in the report by stories of individual patients, not all of whom had adequate attention from an almoner; and the help that such attention could have provided is emphasized.

In a concluding discussion, positive suggestions are made regarding the functioning and development of an

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almoner's department. To deal with young people of the type discussed in the report, trained and experienced almoners or social workers with satisfactory facilities are required. Provision is needed for the systematic interviewing of all such patients, adequate time being essential, as the real problems do not always come out in a short or initial interview. Detailed records are essential, especially to ensure continuity with long-term patients. The almoner should "work with the medical team in close consultation with and under the guidance of the surgeon". It is thought that the surgeon should be kept better informed of the patient's social condition and of the almoner's arrangements, and that the almoner should know more of the relevant details of the patient's medical condition. Finally there is a plea for more effective liaison between the almoner's departments of hospitals and the numerous other social agencies concerned. An interesting appendix deals with the value of the social club; this institution meets the needs of some, but not of others. Clubs exclusively for the physically handicapped have their value, but are probably best as an intermediate agency in adjustment to normal life.

This report does not claim to be comprehensive or conclusive, but it does present some thought-provoking material. In addition to the long-term hospital patient, there is a fairly large group of physically handicapped children not attending hospitals whose plight is similar; notable in this group are those for whom parents have given up seeking treatment, for example, those suffering from spastic paraplegia. It seems desirable that the assistance of the almoner and social worker should be available to both groups if full advantage is to be taken of the possibilities. The cooperation of both the specialist and the general practitioner will help greatly in the task of meeting the individuals' full needs. The very pertinent concluding words of the report set the standard for all those who have to do with the physically handicapped child: "It is on its contribution to the development of personality that the value of any social service to young people must be judged."

THE RESTRICTION OF SALT IN HEART FAILURE.

In the treatment of cardiac failure the restriction of salt is a measure almost universally adopted. Such restriction is, however, more or less casual in most instances, for it is one matter to withhold added salt from a patient's food, and quite another matter to keep him on a diet containing a known and reduced amount of sodium. The results of a diet with a low sodium content in the management of heart failure and the means of maintaining it are dealt with in a paper by Edwin O. Wheeler, William C. Bridges and Paul D. White.¹ The basis of this article is an investigation into the treatment of patients suffering from cardiac failure in various stages. They were observed over a period of one and a half years in the Massachusetts General Hospital. The diet used for in-patients contained about 625 grammes of sodium, and yielded 1,800 Calories; the diet allowed ambulatory patients was less rigid, emphasis being placed on the elimination of all salt from cooking and the use of salt-free bread and butter. In all cases fluids have been allowed without restriction; in some instances the patients were urged to drink larger amounts, up to three litres a day. The authors give the average amounts of salt in various diets. These are 6.0 to 15.0 grammes in average diet, without restriction; 4.0 to 7.0 grammes in an average diet to which extra salt is not added at table; 3.0 to 4.0 grammes without the addition of salt in cooking; and 1.5 to 2.0 grammes in a controlled diet with a low sodium content. The difference in the figures of the last two diets is due to the exclusion of salt from bread and butter in the latter. It is pointed out that in ensuring that a diet should have a consistently low sodium content it is necessary to observe certain precautions. Salt should not be used in cooking or at table, and substitutes containing

sodium should not be allowed; tinned foods unless specially prepared should not be allowed; butter must be washed free of salt or made without it; appetizers and pickles are forbidden; medicines containing sodium must not be prescribed. The advantages of the strict regimen were found to be that thirst was not troublesome, and more fluid could be taken, oedema was more readily controlled and mercurial diuretics were less often needed. There were some disadvantages also. Patients complained of the flat taste of the food, particularly at the beginning of the treatment; they also found difficulty in maintaining the diet after leaving hospital. The lack of sodium in itself did not give rise to any symptoms in this series. The authors have no doubt that the advantages outweighed the disadvantages, and present their results with illustrative cases. Only four of fifty patients refused to cooperate, and for other reasons no evaluation could be made in eleven cases more. Of the remainder, definite improvement was observed in two-thirds of the cases. The usual therapeutic measures such as the administration of digitalis were employed in addition to the dietary control. The patients whose cardiac failure was due to coronary and hypertensive disease responded much better than those whose condition was rheumatic in origin. The authors concluded that the use of a diet with a low sodium content was warranted on both experimental and clinical grounds, and urge a more extended application of strict dietary control in the handling of congestive cardiac failure.

It might be thought that these conclusions are already firmly established, but it is pointed out in this paper that although the value of a milk diet in cardiac failure was known some sixty years ago, the recognition of the significance of restriction of sodium ions has been made only recently. The authors refer to the work of Schroeder in 1941, in which it was shown that if the intake of salt was kept low the intake of water could be raised to as much as four litres a day without the occurrence of oedema in patients with heart failure. The mechanical and chemical factors involved need not be traversed here, but it may be noted that these authors and other physicians who joined in discussion of the paper agree that the theoretical questions raised cannot be completely answered yet. However, it is probably safe to say that an increase in venous pressure alone is not the cause of oedema of the "cardiac" type, even though we may not fully understand the mechanism of sodium retention. F. M. Allen in taking part in the discussion referred to the slowness with which his own advocacy of the restriction of salt in the diet had been accepted. For twenty-five years he has preached this gospel, and still maintains that the same principle should be adopted in the treatment of hypertension. Perhaps he is justified in feeling that his views have been unfairly neglected, though the reasons for results claimed have not always been convincing. As Paul White remarked: "It is too bad that advances in medicine limp along so slowly."

Since work of the kind described is protracted and expensive, reference may be made to a report on the cost of clinical research issued by authority of the Council on Pharmacy and Chemistry of the American Medical Association.² This is designed to help sponsors, and points out clearly the factors which make such research costly. While expensive equipment is not required as a rule, the cost of professional and lay assistants may be considerable, hospital costs are frequently increased above the usual figure, and supplies of material must be adequate. Above all, the exact cost can never be estimated at the outset, nor can a responsible investigator be hedged round with too many restrictions. Coordinating agencies are most desirable, but they should not dictate how an investigation should be carried out or what it should cost, though this does not excuse researchers from failing to analyse their expenditure. It cannot be denied that the cost of clinical research has increased greatly, owing to many factors, of which an important one is the increased complexity of the problems studied. Let us hope that the well of private beneficence will not be dried up because of rightly growing interest in governments in research, for there is much at stake.

¹The Journal of the American Medical Association, January 4, 1947.

²Ibidem.

Abstracts from Medical Literature.

PATHOLOGY.

Morphological Changes in the Red Cells in Relation to Severe Burns.

ACCORDING to Alexander Brown (*The Journal of Pathology and Bacteriology*, July, 1946), investigation of the morphological changes occurring in the red cells of three very severely burned patients has shown that fragmentation of the red cells and microspherocytosis occur within a few hours of the injury. Microspherocytosis was seen in stained films and was shown to be associated with an increase in the mean corpuscular average thickness. Fragmentation of the red cells was most obvious in the most severely burned patient and was associated with hæmoglobinæmia and hæmoglobinuria. The morphological changes occurring in the red cells in burns can be attributed to the direct action of heat on the cells. The maximum effect is immediate fragmentation and destruction. If the damage is less severe microspherocytosis is produced and the affected cells are unduly susceptible to the physiological trauma of the circulation. Depending on the magnitude and rate of hæmolysis, hæmoglobinæmia and hæmoglobinuria may occur.

Morphological Equivalents in Polyarthritides Rheumatica, Periarthritis Nodosa, Transient Eosinophilic Infiltration of the Lung and other Allergic Syndromes.

HILDING BERGSTRAND (*The Journal of Pathology and Bacteriology*, July, 1946) reports four cases which ended fatally with a morbid picture characterized by a variety of allergic symptoms, such as asthma, transient lung infiltration with blood eosinophilia, nasal polypi and abdominal pain with diarrhoea. Of these symptoms asthma was the most conspicuous, and in consequence the conditions were diagnosed as asthma. Histological examination revealed—apart from the ordinary asthmatic lesions—such vascular changes, both in the lungs and in various other organs, as are characteristic of *periarthritis nodosa* and *polyarthritides rheumatica*. Further, in the lungs and other organs there were observed foci where the connective tissue exhibited fibrinoid degeneration—the so-called "Frühinfiltrat"—and rheumatic (including conglomerate) granulomata. In spite of these characteristic "rheumatic" changes the patients had not suffered from endocarditis or polyarthritides, with the exception of one who had had slight joint trouble. The lung changes exhibited close agreement with those described by von Meyenburg as characteristic of acute transient lung infiltration, namely, interstitial inflammation and serous exudation, with eosinophilic cells and giant cells in the alveoli. In the author's cases, however, there were also proliferative processes, indicating the chronic character of the lesion. Nevertheless the lung changes exhibited a still greater resemblance to those described in cases of so-called rheumatic pneumonia. It is concluded that the clinical picture of so-called transient lung infiltration with blood eosinophilia corresponds to an allergic

inflammation in the lungs, which may follow either an acute or a chronic course. The more or less transient nature of the infiltration in many cases is analogous to the transience of the rheumatic swelling of joints and the rheumatic nodes in the skin, which may disappear in about twenty-four hours or may remain for months or years. The author regards such syndromes as *polyarthritides rheumatica*, *periarthritis nodosa*, *endocarditis*, *myocarditis* and *pericarditis rheumatica* and transient lung infiltration with eosinophilia *et cetera* as equivalents, that is, manifestations of the antigen-antibody reaction localized to different organs. The clinical classification of cases is dependent on the particular organ in which the reaction is most pronounced, but cases are met with in which so many organs react at the same time that a topographical classification is almost impossible. As regards the transient lung infiltration, it would appear that, as in the case of asthma, a distinction can be made between a slighter "extrinsic" form, in which the antigen is non-bacterial, and a severer "intrinsic" form, in which it is bacterial. Certain statements in the literature indicate that this analogy might perhaps be extended to include the allergic syndromes in general.

Fulminating Meningococcal Septicæmia Associated with Adrenal Lesions.

THE confusion surrounding the use of the term "Waterhouse-Friderichsen syndrome" is pointed out by J. Murray Kinsman, C. Anthony D'Alonzo and Simon Russi (*Archives of Internal Medicine*, August, 1946), and they suggest that it should either be abandoned entirely or else be rigidly restricted to those patients who presented the clinical picture of an acute fulminating febrile disease and in whom adrenal hemorrhages were found *post mortem*. Acute septicæmia of proved cause should be called "fulminating septicæmia". Seven cases of proved fulminating meningococcal septicæmia are reported by the authors; two patients recovered, and the clinical and pathological observations are presented in detail. In three of the fatal cases adrenal hemorrhage was shown, while, in the other two, adrenal changes were present, consisting of zonal degeneration and conspicuous congestion in the inner layers of the cortex, with "tubular changes" in the outer layer. In one case there were myocardial changes which were sufficient to have caused a circulatory collapse, but in the others there were no significant changes apart from those in the adrenal glands. The authors believe that the cause of the circulatory collapse is the effect of the bacterial poisons on all the tissues of the body. In this the adrenal glands play a part, but only a part; they are not wholly responsible for the collapse. It is suggested that in addition to the toxic effect of the poisons and the diminution of the adrenal hormone supply a depletion of vitamin C may be a factor. The theory is advanced that the changes in the adrenal glands can be accounted for as follows. The increased demand on the adrenal glands, as a result of the infection, depletes the cortical cells of their lipid (hormone-containing) material; the cells degenerate more rapidly than normally, producing the "tubular" pattern in the outer layers and more conspicuous lesions in the inner layers, with

eventual lysis of many of the cells before they have reached their usual site of death; this stage is considered reversible. Later, as a result of the loss of support of the sinusoids because of the premature death of the cortical cells, rupture and hæmorrhage may occur—an irreversible stage. The patient may die before hæmorrhage occurs.

Blood and Bone Marrow in Infectious Mononucleosis.

LOUIS R. LIMARZI, JEROME T. PAUL AND HENRY G. PONCHER (*The Journal of Laboratory and Clinical Medicine*, October, 1946) report that in spite of the large number of atypical lymphocytes in the peripheral blood in infectious mononucleosis, the bone marrow is not involved. The bone marrow in infectious mononucleosis reveals a myeloid hyperplasia and immaturity. This may be explained by the "toxic agent" of the disease causing either a so-called maturation arrest with subsequent myeloid hyperplasia or a suppression of the release mechanism of the myeloid cells which likewise results in a myeloid hyperplasia of the bone marrow. The atypical lymphocytes in infectious mononucleosis show none of the metastatic or replacement characteristics of leucæmia cells. In contrast, in cases of leucæmia with many abnormal cells in the peripheral blood, the bone marrow reveals varying degrees of replacement of the normal marrow by leucæmic cells. This is seen in the bone marrow regardless of whether the blood count reveals decreased, normal or increased numbers of lymphocytes in the circulation.

Study on the Seminoma.

UNDER the heading "*Étude sur le séminome*", Pierre Masson (*Revue canadienne de biologie*, Volume V, Number 4, 1946) describes six testicular tumours which differ from the seminomata of Chevassu (dysgerminomata of R. Meyer, embryonal carcinomata of Ewing) by their greyish-white colour, their oedematous aspect and the absence of necrotic and hæmorrhagic foci. These tumours are composed of irregular cells, smaller than those of the classical seminomata, their cytoplasm is devoid of glycogen, the stroma is scanty and not infiltrated by lymphocytes. Many of the nuclei have a filamentous structure and present a persistent spireme which resembles that of the spermatocytes of first order. The cells have a marked tendency to invade the seminiparous tubes, and in one case the genesis of a neoplastic focus has been observed in one of the tubes. The author could find no trace of teratoma in any of the cases. By its cytological characters, its mode of invasion and its genesis, this type of tumour seems to arise from masculine germinal cells and deserves the name of spermatocytic seminoma. It so deeply differs from the classical seminoma of man that one is allowed to question the germinal origin of this last type.

Solid Teratomata of the Ovary with Neuroglial Metastases.

To ten solid teratomata of the ovary with neuroglial metastases on the peritoneum reported up to the present, George G. Proskauer (*American Journal of Obstetrics and Gynecology*, November, 1946) has added one that contained

fully developed cerebellar cortex and that was associated with a dermoid cyst of the other ovary. The neuroglial metastases from solid teratomata of the ovary are dissemination metastases on the peritoneum. They consist almost always of pure neuroglial tissue. In exceptional cases there may be proliferating neuroepithelium, cartilage, or bone among the neuroglia. The nervous tissue of the primary tumour may be highly developed (ganglion cells of various mature types; ganglion cells arranged in layers with remnants of meninges; gyrus formations; cerebellar cortex). The neuroglia in both primary tumour and the metastases may be fully mature, of an "embryonal" type, resembling a round-cell sarcoma, or of highly malignant character similar to a glioblastic sarcoma. According to the clinical observations, the neuroglial metastases of mature tissue seem to degenerate and disappear after extirpation of the primary tumour. Extremely cellular or immature neuroglia in the primary tumour or in the metastases may give rise to recurrences, and finally cause death.

Permeability of the Human Placenta to Isoantibodies.

ALEXANDER S. WIENER AND EVE B. SONN (*The Journal of Laboratory and Clinical Medicine*, September, 1946) describe two cases of erythroblastosis due to A and B sensitization. Comparative titrations by the agglutination and conglutination techniques of the α and β antibodies in the maternal and infants' sera indicate that glutinins (univalent antibodies) traverse the placenta more readily than agglutinins (bivalent antibodies). This supports the hypothesis that glutinins (or blockers) are comprised of smaller molecules than agglutinins.

MORPHOLOGY.

Morphogenesis of the Thymus.

C. E. KLAPPER (*American Journal of Anatomy*, March, 1946) reaffirms the epithelial, mainly endodermal, origin of the thymic cytotreticulum, and finds that the thymocytes are of mesodermal origin. During development, large lymphocytes invade the thymus from the surrounding connective tissue and quickly change from large to small lymphocytes (thymocytes) after they enter the thymus. The author states that Hassall's corpuscles are of endodermal origin, and finds no evidence of their development from the mesenchymal elements or the invading blood vessels. Various other observations on the development of the pharynx generally are also recorded.

Position and Mobility of Duodenum.

S. M. FRIEDMAN (*The American Journal of Anatomy*, July, 1946) comments on the lack of accurate information concerning both the position and the mobility of the duodenum in the living subject and submits results of an extensive investigation. Serial skiagrams of approximately four hundred and fifty hospital patients with a normal alimentary tract were studied and the following facts about the duodenum are submitted. The mean position of the highest point of the first part of the duodenum is opposite the lower part of the second

lumbar vertebra, varying between the twelfth thoracic and the third lumbar vertebra. The variation is due in part to a downward migration with age of the duodenal high point at a statistical rate of about half a vertebra per decade. The mean position of the lowest point of the third part of the duodenum is opposite between the third and fourth lumbar vertebrae, varying between the second and the fifth lumbar vertebrae. The third part of the duodenum does not migrate downwards with age, so that there is a constant tendency towards shortening of the vertical diameter of the duodenal curve as age advances. The most fixed point of the duodenum is the duodeno-jejunal flexure, opposite the second lumbar vertebra or the vertebra immediately above or below. It does not migrate with age. Depending on the state of fullness of the stomach and intestine, postural changes may induce an excursion of the duodenum of about the depth of two vertebrae. Downward excursions occur about the duodeno-jejunal flexure as fixed pivot with consequent shortening of the vertical duodenal diameter. Upward excursions involve the whole duodenum including the duodeno-jejunal flexure.

Nuclei of Extrapyramidal System.

E. R. A. COOPER (*Brain*, March, 1946) presents a series of papers on the development of nuclei of the so-called extrapyramidal system and other mesencephalic and related nuclei, namely, *corpus striatum*, red nucleus, *substantia nigra*, *et cetera*. The author points out that despite the functional importance of the extrapyramidal system, little is known of the origin of its parts, knowledge of which is necessary before the study of pathological changes in the extrapyramidal syndrome is attempted. The origin and development of these nuclei are traced in a series of human embryos and foetuses. Among the many facts established, it is noted that the author reveals the occurrence of a direct fibre connexion from the optic tract to the *substantia nigra*, and to the subthalamic body through the cerebral peduncle, and an indirect optic-nigral connexion via the subthalamic nucleus.

Adrenal Cortex after Hypophysectomy.

H. W. DEANE AND R. O. GREIF (*The American Journal of Anatomy*, July, 1946) studied the changes in the adrenal cortex which occur after removal of the hypophysis in rats and other mammals. Hypophysectomized rats were killed in small groups at intervals up to one hundred and thirty-six days after operation. The loss of weight of the adrenals, in the area of the cortices, and in the average areas of the cells of the cortex is abrupt during the first ten days, and then more gradual. Measurements of the areas of the cells of the *zona glomerulosa*, of the outer and inner layers of the *zona fasciculata*, and of the *zona reticularis* show that normally the cells of the outer layer of the *zona fasciculata* are much larger than those of the other zones. After atrophy the cells of all four zones are of a similar, reduced size. The adrenals were studied histochemically for ketosteroids, that is, for sudanophil lipids which are "Schiff-positive", form phenylhydrazones, and are birefringent and autofluorescent. The livers were studied for lipids and glycogen. In addition, mitochondrial preparations of both organs were

examined. The normal histology of the two organs is described. After hypophysectomy, ketosteroids gradually disappear from the *zona fasciculata* of the adrenal cortex, but persist in the *zona glomerulosa*. The mitochondria also change in the *zona fasciculata*, but not in the *zona glomerulosa*. Liver glycogen is reduced from the normal level and has disappeared within fifty-six days. These facts indicate that the carbohydrate-regulating principles of the adrenal cortex which are under pituitary control are secreted by the *zona fasciculata*, while the salt-regulating fractions which are not entirely under pituitary control are probably formed in the *zona glomerulosa*. The suggestion is made that the cells of the *zona glomerulosa* do not migrate, whereas those of the *zona fasciculata* arise in the subglomerulosa layer and move inward to die in the *zona reticularis*.

Uterine Accommodation of the Conceptus.

S. R. M. REYNOLDS (*The Anatomical Record*, July, 1946) states that the uterus may be said to accommodate the products of conception by a succession of stages, which include a phase of preparation (mitotic proliferation of uterine elements), uterine enlargement (hypertrophy of all uterine elements), and uterine stretching (cessation of uterine growth with rapid enlargement of the products of conception). The author shows that uterine growth in the period of uterine enlargement is directly related to tension on the uterine wall. Circulation of maternal blood through the uterus bears an inverse relationship to the tension on the wall of the uterus; foetal growth, which is very small until the period of uterine stretching commences (that is, a time of lower tension on the uterus), is inversely related to the tension on the uterine wall. Foetal death (resorption) is observed to occur most frequently at the end of the phase of uterine enlargement (maximum spheroid size), when tension on the wall of the uterus is maximal just prior to elongation.

Anomalous Middle Meningeal Artery.

F. N. LOW (*The Anatomical Record*, July, 1946) reports a case of a middle meningeal artery. The abnormal origin and course differed so greatly from the normal that such an anomaly, surgically encountered, would be difficult to interpret unless such a condition was previously known to exist. The artery entered the middle cranial fossa from the orbit through the *foramen meningo-orbitale*, which was located on both sides about two millimetres lateral to the apex of the superior orbital fissure. The *foramen spinosum* was absent. The intracranial course of the artery and its branches are described and illustrated.

Unequal Pupils in Man.

E. A. TURNER (*Brain*, June, 1946) describes a simple test for investigating the cause of inequalities of the pupils, and his results suggest that the commonest cause in recent head injuries is a partial third nerve paresis, which may affect the pupil without there being any demonstrable external ophthalmoplegia. Other cases, including several intracranial tumours, are described with the results of the test.

Bibliography of Scientific and Industrial Reports.¹

THE RESULTS OF WAR-TIME RESEARCH.

During the war a great deal of research was carried out under the auspices of the Allied Governments. It has been decided to release for general use a large proportion of the results of this research, together with information taken from former enemy countries as a form of reparations. With this end in view, the United States Department of Commerce, through its Publication Board, is making a weekly issue of abstracts of reports in the form of a "Bibliography of Scientific and Industrial Reports". This bibliography is now being received in Australia, and relevant extracts are reproduced hereunder.

Copies of the original reports may be obtained in two ways: (a) Microfilm or photostat copies may be purchased from the United States through the Council for Scientific and Industrial Research Information Service. Those desiring to avail themselves of this service should send the Australian equivalent of the net quoted United States price to the Council for Scientific and Industrial Research Information Service, 425, St. Kilda Road, Melbourne, S.O.E., and quote the PB number, author's name, and the subject of the abstract. All other charges will be borne by the Council for Scientific and Industrial Research. (b) The reports referenced with an E number may be obtained in approved cases without cost on application to the Secondary Industries Division of the Ministry of Post-War Reconstruction, Wentworth House, 208, Collins Street, Melbourne, C.I. Copies of these are available for reference in public libraries.

Further information on subjects covered in the reports and kindred subjects may be obtained by approaching the Council for Scientific and Industrial Research Information Service, the Secondary Industries Division of the Ministry of Post-War Reconstruction, or the Munitions Supply Laboratories (Technical Information Section), Maribyrnong, Victoria.

PB 1684. Six groups of pamphlets on German medicine (microfilm). 1,430 pp. Price: Microfilm, \$6.00; Enlarged Prints, \$14.00.

This report is a microfilm reel containing reprints from the Laboratory of Organic Chemistry, Utrecht, Holland, reprints of publications of the staff of the scientific laboratory of P. Beiersdorf and Company, Hamburg, reprints from the Institut für Schiffs- und Tropenkrankheiten, Hamburg, and a reprint from the Pharmacologic Institute of the University of Hamburg. The articles included on this reel, all of which are in German, are as follows:

63. Weyer, F. Die Gesetzmässigkeiten in der geographischen Verbreitung der Rassen von *Anopheles maculipennis*. (The uniformity in geographic distribution of strains of *Anopheles maculipennis*.) Norsk entomologisk Tidsskrift, 5, 168 (1940). 9 pp.

64. Weyer, F., and Hundertmark, A. Versuche über die Vorzugstemperatur einiger Anophelen der Elablage. (Experiments on optimal egg-laying temperatures in some *Anopheles*. Revista di malarologia, 20, 251 (1941). 9 pp.

65. Zumpt, F. Ornithodoros moubata Murray and andere Rückfallfieberzecken. (Ornithodoros moubata Murray and other relapsing fever ticks.) Merkblätter des Instituts für Schiffs- und Tropenkrankheiten. Reprint from Deutsche tropenmedizinische Zeitschrift, 46, No. 12 (1942). 6 pp.

66. Zumpt, F. Hat Haemalastor Koch, 1844, die Priorität vor Amblyomma Koch, 1844? (Does Haemalastor Koch, 1844, have priority over Amblyomma Koch, 1844?) Zoologischer Anzeiger, 142, 145 (1943). 3 pp.

67. Zumpt, F. Vergleichende Prüfung einiger bekannten Körperentlausungsmittel. (Comparative testing of some well-known drugs as body lousecides. Zeitschrift für hygienische Zoologie und Schädlingsbekämpfung, 36, 25 (1944). 10 pp.

68. Zumpt, F. Die Rassenfrage bei *Anopheles maculipennis* Meigen. I. Beitrag zum Problem der Artbildung und Artbegrenzung. (The problem of species in *Anopheles maculipennis* Meigen. I. Contribution to the problem of development and limitation of species.) Zeitschrift für Parasitenkunde, 12, 372 (1941). 18 pp.

69. Zumpt, F. Haematopinus aperis Ferris, eine für Deutschland neue Läuseart. (Haematopinus aperis Ferris,

a new type of louse in Germany.) Anzeiger für Schädlingskunde, 18, No. 5 (1942). 3 pp.

70. Hundertmark, A. Versuche und Beobachtungen über des Verhalten von *Anopheles maculipennis* bei verschiedener Luftfeuchtigkeit und Temperatur. (Experiments and observations on reaction of *Anopheles maculipennis* under varying degrees of humidity and temperature.) Zeitschrift für angewandte Entomologie, 27, 667 (1941). 30 pp.

71. Zumpt, F. Die Tsetsefliegen und ihre Bekämpfung. (The tsetse flies and their control.) Deutsche tropenmedizinische Zeitschrift, 45, 118 (1941). 7 pp.

72. Martini, E., and Hundertmark, A. Über die Bedeutung kleinklimatischer Feststellungen im Haus und Stall und im Freien für die Schädlingsbiologie. (Concerning the significance of microclimatic determinations in house, barn and open air for the biology of parasites.) Anzeiger für Schädlingskunde, 16, 97 (1940). 5 pp.

73. Zumpt, F. Die Konservierung der Zecken. (The preservation of ticks.) Zeitschrift für Parasitenkunde, 11, 679 (1940). 8 pp.

74. Martini, E. Die Entomologie im Kulturleben der Zeit. (The place of entomology in modern culture.) VII. Internationaler Kongress für Entomologie, 1938, 1. 19 pp.

75. Hundertmark, A. Versuche und Beobachtungen über das Verhalten von *Anopheles maculipennis* bei verschiedener Luftfeuchtigkeit und Temperatur. (Research and observations concerning the reaction of *Anopheles maculipennis* to varying degrees of humidity and temperature.) Zeitschrift für hygienische Zoologie und Schädlingsbekämpfung, 32, 85 (1940). 10 pp.

76. Zumpt, F. Das Präparieren kleiner Dipteren mittels der Klebemethoden. (The preparation of small Diptera by use of the adhesive method.) VII. Internationaler Kongress für Entomologie, 1938, 3, 111. 3 pp.

77. Muhlsens, Peter. Fleckfieberforschungsergebnisse. (Results of research on typhus.) Beiträge zur Kolonialforschung, 1, 129. No date. 21 pp.

78. Muhlsens, P. Differentialdiagnose der wichtigsten Fieberkrankheiten von Südsuropa. (Differential diagnosis of the most important febrile diseases incident to southern Europe.) Deutsche Militärärzte, 6, 567 (1941). 5 pp.

79. Muhlsens, P. Die Bedeutung des Fleckfiebers für Afrika. (Significance of typhus in Africa.) Deutsche tropenmedizinische Zeitschrift, 45, 248 (1941). 9 pp.

80. Nauck, E. G. Malaria und Fleckfieber; vergleichende pathologisch-anatomische Betrachtung. (Comparative anatomic-pathologic studies of malaria and typhus.) Deutsche medizinische Wochenschrift, 67, 1,259 (1941). 9 pp.

81. Nauck, E. G. Die Bedeutung des Gelbfiebers für Afrika. (The significance of yellow fever for Africa.) Deutsche tropenmedizinische Zeitschrift, 45, 272 (1941). 6 pp.

82. Nauck, E. G. Kanarienvogelpocken. (Canary pox.) Handbuch der Viruskrankheiten, 1, 342 (1939). 11 pp.

83. Nauck, E. G. Neuere Ergebnisse aus der Lymphogranuloma inguinale Forschung. (Results of recent research on lymphogranuloma inguinale.) Acta conventus tertii de tropicis atque malarie morbis, 1, 444. No date. 8 pp.

84. Nauck, E. G. Viruskrankheiten und Infektionen mit ungeklärter Ätiologie; das Gelbfieber. (Virus diseases and infections of uncertain aetiology; yellow fever.) Die ansteckenden Krankheiten, Second Edition, 1942, 452. 7 pp.

85. Nauck, E. G., and Weyer, F. Versuche zur Züchtung von Rickettsien in explantiertem Läusegewebe. (Experimental culture of Rickettsia in explanted louse tissue.) Zentralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten, I. Abteilung, Orig., 147, 365 (1941). 11 pp.

86. Nauck, E. G., and Zumpt, F. Versuche zur Übertragung des epidemischen Fleckfiebers durch die Wanzen Cimex lectularius L. und Triatoma rubrofasciata De Greer. (Experiments in transmission of epidemic typhus by bedbugs, Cimex lectularius L. and Triatoma rubrofasciata De Greer.) Ibid., 147, 376 (1941). 6 pp.

87. Nauck, E. G., and Zumpt, F. Versuche zur Übertragung des murinen Fleckfiebers durch die Bettwanze. (Experiments on the transmission of rat typhus by means of bedbugs.) Ibid., 146, 97 (1940). 7 pp.

88. Nauck, E. G. Dengue. (Dengue fever.) Die ansteckenden Krankheiten, Second Edition, 1942, 458. 9 pp.

89. Loos, W. Die Kältekonservierung des Fleckfiebervirus. (The cold preservation of typhus virus.) Deutsche tropenmedizinische Zeitschrift, 46, 564 (1942). 3 pp.

90. Loos, W. Anwendung der Phasenkontrastmikroskopie auf Modellversuche zum Poliervorgang an Gläsern. (The use of phase contrast microscopy in model experiments for the polishing of glasses.) Naturwissenschaften, 29, 769 (1941). 2 pp.

¹ Supplied by the Information Service of the Council for Scientific and Industrial Research.

91. Metzner, Siegfried. *Entwicklung und gegenwärtiger Stand der Pestverbreitung in Afrika.* (The development and present status of plague dissemination in Africa.) *Deutsche tropenmedizinische Zeitschrift*, 47, 399 (1943). 39 pp.

92. Sonnenschein, Curt. *Rundschau: exotische Infektionskrankheiten: Lepra (Aussatz).* (Exotic infectious diseases; leprosy. A review.) *Jahreskurse für ärztliche Fachbildung*, 32, 33 (1941). 18 pp.

93. Sonnenschein, Curt. *Haus- und Krankenhausbau in den Tropen.* (Construction of dwellings and hospitals in the tropics.) *Deutsche tropenmedizinische Zeitschrift*, 45, 326 (1941). 9 pp.

94. Sonnenschein, Curt. *Verzeichnis der im Jahre, 1939, erschienenen Dissertationen und Habilitationsschriften aus dem Gebiet der Tropenmedizin und Tropenhygiene, Auslandsmedizin und deren Grenzgebieten.* (Bibliography of dissertations and academic treatises on tropical medicine, tropical hygiene, medicine in foreign countries, and related subjects that appeared in 1939.) *Ibid.*, 45, 316 (1941). 6 pp.

95. Lippelt, H. *Malta-Fieber, Diagnose, Klinik und Therapie.* (Beobachtungen in Deutsch-Südwestafrika, 1938-1939.) (Malta fever: diagnosis, clinical aspects and therapy; observations in German southwest Africa, 1938-1939.) *Ibid.*, 45, 235 (1941). 4 pp.

96. Lippelt, Heinrich. *Zur Diagnostik, pathogener Darmbakterien. (Nachprüfung eines neuen kombinierten Nährbodens.)* (Concerning the diagnosis of pathogenic intestinal bacteria. (Use of a new combined culture medium in diagnosis of pathogenic intestinal bacteria.)) *Zentralblatt für Bakteriologie, Parasitenkunde, und Infektionskrankheiten, I. Abteilung, Orig.*, 147, 260 (1941). 8 pp.

97. Lippelt, H. *Beobachtungen über die Verbreitungsweise der Bacillen der Gasbrandgruppe im menschlichen und tierischen Organismus.* (Studies on modes of dissemination of gas gangrene bacillus in human and animal organisms.) *Deutsche Militärarzt*, 6, 144 (1941). 5 pp.

98. Bock, E. *Über die zukünftige Verwendungsmöglichkeit der Tiefgefrierkammer in den Tropen.* (Possibilities for future use of deep-freezing for the preservation of foods in the tropics.) *Deutsche tropenmedizinische Zeitschrift*, 45, 334 (1941). 5 pp.

99. Sonnenschein, C. *Rundschau: exotische Infektionskrankheiten. (Cholera; plague.) Jahreskurse für ärztliche Fachbildung*, 31, 40 (1940). 12 pp.

100. Aschenbrenner, Reinhard, and v. Baeyer, Walter. *Epidemisches Fleckfieber; eine klinische Einführung.* (Epidemic typhus; introductory clinical study.) 1944. 208 pp.

101. Volbehr. *Die Läuse des Menschen und ihre Bekämpfung.* (The lice of human beings and their control.) *Hygienische Untersuchungsstelle des Wehrkreises X.* 1942. 24 pp.

102. Keeser, E. *Über die Wirkungsweise organischer Nitroverbindungen.* (Concerning the effect of organic nitro compounds.) *Naunyn-Schmiedeberg's Archiv für experimentelle Pathologie und Pharmakologie*, 192, 617 (1939). 10 pp.

PB 32549. SCHWARTZ, P. PLATO. Investigation of prostheses as related to thigh amputations. (FIAT Final Report 158.) May, 1946. 8 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

This report summarizes the results of United States investigations of two German designs of prosthetic devices for thigh amputees. One is mass produced except for bucket, adjusted for length, bilateral, requires no harness, functionally efficient. The other, an hydraulic mechanism, significantly advances the possibility of more normal function. No diagrams included. Bibliography.

PB 23575. KRÜPE, MARTIN. *Die Senkungsbereitschaft menschlicher Erythrozyten im Verlauf der Blutkonservierung.* (The sedimentation tendency of human erythrocytes in the course of blood preservation.) (ALSOS Mission Hoyt File.) January, 1943. 31 pp. Price: Microfilm, 50c.; Photostat, \$3.00.

Object of the study was to ascertain whether blood that had lost its physiological properties during storage outside the human body would recover them after transfusion. In the introductory part of the paper Frimberger's explanations of the mechanism of erythrocyte sedimentation are presented. Contrary to animal erythrocytes, human ones have a high agglomeration tendency if suspended in preserving solutions. Systematic experiments were carried out to determine (1) the osmotic resistance of the erythrocytes of blood stored between 11-49 days (a) for samples of whole blood, (b) for samples of twice washed erythrocyte sediment; (2) the influence of the temperature on the sedimentation rate: (a) the samples were not heated, (b) the samples were allowed to adjust to room temperature for twenty hours before the sedimentation test, (c) the samples were heated to 37° C. three hours before the test; (3) the influence of temperature on the tendency of erythrocytes to agglomerate (a) the samples were previously not heated, (b) the samples were heated to 37° C. three hours before the test; (4) same as (1)

under the influence of temperature, (a) the samples were previously not heated, (b) the samples were heated to 37° C. three hours before the test; and (5) the agglutination of 1% erythrocyte suspensions (three samples of blood groups A, A₂ and B) with anti-A—or anti-B—isosera at room temperature. The results of these experiments are presented in four tables, five graphs and three pictures. A bibliography of 21 items is also attached.

PB 23595. KLEWE, H. Professional correspondence and file memoranda on chloramine as a disinfectant. (ALSOS Klewe T 1.) 1942-1943. 163 pp. Price: Microfilm, \$2.00; Photostat, \$11.00.

This report contains correspondence between a Dr. Klewe, military surgeon in the "Militärärztliche Akademie", and the Fahlberg-List, A. G., Chemische Fabriken, Magdeburg, covering the period December, 1941, to August, 1943, and dealing with tests made by Dr. Klewe on various chloramine preparations manufactured by Fahlberg-List, to determine their value as disinfecting agents. Reports on specific tests of such preparations as monochloramine and dichloramine, "Textisept" (a chloramine-sodium compound), "Mykosept" (a chloramine-magnesium compound), "Sagrotan", "Caporit" et cetera, and their use as disinfectants for hands, clothing and rooms, as a bactericidal agent against tubercle bacilli (in sputum and clothing), typhoid bacilli, *Bacillus coli* and staphylococci, and as a delousing agent are included. In German.

PB 19445. RAUSCH, WALTER. Sericin (Sericin). (Reichsforschungsrat.) (ALSOS Mission, RFR 507, 32.) October, 1944. 6 pp. Price: Microfilm, 50c.; Photostat, \$1.00.

Investigation of cultures of various types of bacteria on sericin, a by-product of silk manufacture, revealed that this substance is equal, and in some instances, superior, to agar-agar as a culture medium. The article also describes tests of the chemical and physical properties of sericin; diagrams illustrate the apparatus used and the results obtained in these tests. In German.

PB 31613. AYRES, P. B., et alii. Aero, surface and submarine medicine and research in the Japanese Navy. (Naval Tech. Mission to Japan Rept., Index M-06.) December, 1945. 73 pp. Price: Microfilm, \$2.00; Photostat, \$5.00.

This report covers Japanese medical research activities in the following fields: Part I. Aviation medicine and research. A. General. (1) Improvement of night vision, (2) test of personnel for night vision, (3) requirements for visual acuity and colour perception, (4) sunglasses, (5) psychological screening for aviation personnel, (6) use of oxygen, (7) acceleration effects, (8) drugs for altitude flight, (9) vibration effects, (10) low cockpit temperatures, (11) electrically heated flying suits, (12) survival equipment, (13) use of chemical oxygen generators in airplanes, (14) rations for life rafts. B. Aviation medicine. (1) Personnel selection tests, (2) oxygen equipment and masks, (3) diet and rations, (4) pilot fatigue. Part II. Submarine medicine and research. A. General. (1) Air purification, (2) oxygen and carbon dioxide percentages, (3) air cooling apparatus, (4) selection of personnel, (5) change of crews after patrols, (6) adverse effect of long patrols, (7) effects of submergence in tropics, (8) medical and hygienic problems. B. Submarine medicine. (1) Heat and rash and fungous infections, (2) odour control and sanitation, (3) length of cruises and submergence, (4) two-man submarine. C. Submarine medical research. (1) Carbon dioxide absorption, (2) living conditions. Part III. Surface craft medicine and research. (1) Tolerance to heat and cold, (2) clothing, (3) tropical deterioration, (4) seasickness, (5) hygiene and sanitation, (6) training of surface suicide craft personnel, (7) flash-burn protection. The document contains seven diagrams, twenty-eight pictures, and seven enclosures dealing mainly with special topics of research and Japanese source material.

PB 31969. U.S. NAVAL TECHNICAL MISSION TO JAPAN. Bacteriology and chemistry in the Japanese Navy. (Rept., Index M-10.) November, 1945. 14 pp. Price: Microfilm, \$1.00; Photostat, \$1.00.

Questioning of Japanese naval medical personnel on the specific items requested in this target elicited negative answers. The Army Technical Medical Mission was able to contact several civilian institutions which had some research work on these subjects. The titles of papers they found are appended (Reference "C"). Work of any value for this particular target came chiefly from the Government Infectious Disease Research Institute, located in Tokyo, with Dr. Miyagawa in charge, which target the army likewise has well exploited. The information recorded in this report may be of some value, in that it is revealing, even though of a negative character. Bacteriology in the navy during the recent years had been of a very restricted nature. Diagnostic work was limited to the minimum necessary for physico-chemical analysis, and "infectious disease" laboratory procedures. A few reports on research projects have been included in the references.

Dr. J. A. Gollan and Dr. G. M. W. Clemons were elected members of the Council. The chairman declared the following offices vacant: president-elect, vice-president, councillor (one vacancy). These vacancies will be filled by the Council.

Messrs. Adams and Bennetto were reappointed auditors for the ensuing year.

Induction of President.

Dr. T. H. Goddard inducted Dr. J. L. Grove to the office of President and vacated the chair in his favour. Dr. Grove thanked the members for his election.

Powers of the Federal Council.

A discussion took place on a resolution sent from the Federal Council regarding its powers. It was resolved that the Branch approved of the principle embodied in the Federal Council's resolution.

Retiring President's Address.

Dr. T. H. Goddard then read his retiring president's address (see page 517).

Correspondence.

DUPUYTREN'S CONTRACTURE.

SIR: I am an oculist and therefore have no special knowledge of Dupuytren's contracture, and were it not for the fact that I happen to possess one, would not have intruded in the discussion.

I am well aware that it is difficult to draw conclusions from one case, but I am firmly convinced that mine was caused by chronic irritation, and that for the following reasons. It is in my right palm (I have no vestige of one in the left). I have been and still am a keen and persistent tennis player, right handed, of course. For many years I used to hold the racquet too far up in my hand, the bottom of the handle used to reach exactly where the contracture now is, and this condition gradually grew worse. I then became perturbed about it and sought confirmation of the diagnosis, which I obtained in several different quarters.

About five years ago I brought the grip of the racquet back so that the end of the handle is now quite outside my palm. Since then this condition has made no progress. Indeed I am prepared to maintain that it has regressed.

Yours, etc.,

D. R. GAWLER.

Chennell House,
260, St. George's Terrace,
Perth,
Western Australia.
April 10, 1947.

Naval, Military and Air Force.

APPOINTMENTS.

The undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Numbers 60 and 70, of March 27 and April 10, 1947.

CITIZEN NAVAL FORCES OF THE COMMONWEALTH.

Royal Australian Naval Reserve.

His Excellency the Governor-General in Council has approved of the following appointments being terminated: Acting Surgeon Lieutenant-Commander James Stuart Guest, O.B.E., 4th November, 1946. Surgeon Lieutenants Allan Robert McKenzie, 5th November, 1942, Ian Holland Martin, 20th December, 1944, William Ross Adey, 28th October, 1946, Austen Stewart Ferguson, 30th October, 1946, Walter Selwyn Georgeson, 5th November, 1946, Edward Winston Freshney, 10th November, 1946, Graham Henry Barnard Brooke, 14th November, 1946, Edward Preen Cordner, 18th November, 1946, George Montario Bedbrook, 25th November, 1946, Lindsay Vaughan Carter, 25th November, 1946, Gerald Broonan, 26th November, 1946, Percy Maxwell Brett, 29th November, 1946, Colin Sergeant Richards, 29th November, 1946, Brian Oxenham, 16th December, 1946, Norman Alfred Richards, 18th December, 1946, and Peter Ronald Brett,

31st December, 1946. Surgeon Lieutenants Henry George Rischbieth, 2nd January, 1947, and Reginald Roberts Sobey, 17th January, 1947.

ROYAL AUSTRALIAN AIR FORCE.

Citizen Air Force: Medical Branch.

The appointments of the following Flight Lieutenants are terminated on demobilization: V. G. Walker (256955), 30th January, 1947, D. L. Rodgers-Wilson (257702), 20th February, 1947.

The appointment of Temporary Squadron Leader A. E. Kahn (262061) is terminated on demobilization, 28th February, 1947.

Reserve: Medical Branch.

The following ex-officers are appointed to commissions with the rank of Flight Lieutenant, 1st March, 1947: Alan Peter Roberts (266395), Lynn David Walters (277535).

The following ex-officers are appointed to commissions with the temporary rank of Squadron Leader: Albert Edward Kahn (262061), 1st March, 1947, Henry Emerson Wescombe Lyons (282726), 20th March, 1947.

Obituary.

BERNARD TRAUGOTT ZWAR.

WE are indebted to Dr. L. S. Latham for the following account of the career of the late Dr. Bernard Traugott Zwar.

Dr. Bernard Traugott Zwar, whose death was announced in a previous issue, was born in South Australia. He commenced his medical course in Adelaide, and came to Melbourne and graduated M.B. in 1899 and B.S. in 1900. He became senior resident medical officer at the Melbourne Hospital in 1900-1901. From 1901-1904 he was medical superintendent of the Austin Hospital. He obtained the degree of M.D. in 1902. Proceeding to England and Germany for post-graduate study, he showed special interest in neurology and in tuberculosis. On his return to Melbourne he gained the degree of M.S. in 1908 and joined the staff of Saint Vincent's Hospital, being surgeon to out-patients and junior surgeon to in-patients in 1909. He played an active part in the movement for the recognition by the University of Melbourne of Saint Vincent's Hospital as a clinical school and was a very keen and successful clinical teacher there. It was, however, no secret that he wished to resume association with the Melbourne Hospital, and in 1911 he resigned from Saint Vincent's and applied for a position of out-patient surgeon at "the Melbourne". In this he was unsuccessful, but a few months later was appointed and remained on the out-patient staff until 1919. From 1919 to 1935 he was honorary in-patient surgeon; from 1935 honorary consulting surgeon.

On the outbreak of war in 1914 he volunteered at once and served in 1914-1916 as major in the Second Australian Stationary Hospital and later in the Second Australian General Hospital. At the Gallipoli landing he worked unceasingly in the care of the wounded.

In 1916 he returned to Melbourne, married Miss Essie Craig and lived for some years in Collins Street. Later, impelled by his intense love of flowers and gardening, he bought a site in Malvern where he built his home and established a garden that was his delight through all his remaining years. In 1927 he again visited Great Britain and Europe, this time with his wife and son.

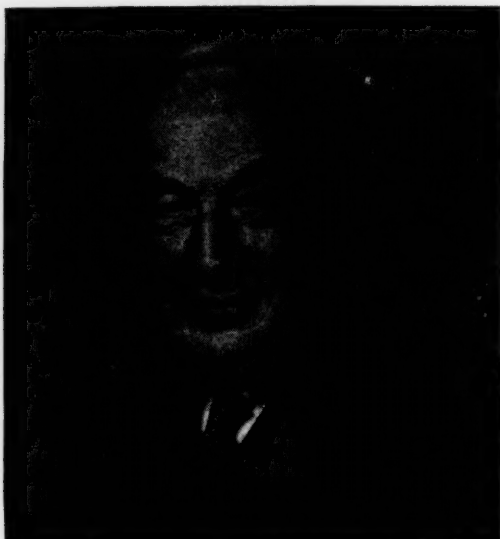
He had joined the Committee of Management in 1925 and was President of the (now) Royal Melbourne Hospital from 1937 until 1945. In this capacity he worked strenuously to secure the rebuilding of the hospital on the Parkville site, adjacent to the university. This project had been always close to his heart and he lived to see it accomplished. From 1937 until his death he was chairman of the Board of the Walter and Eliza Hall Institute of Research in Pathology and Medicine. He made every effort to develop the closest relations between the institute and the university. To him is largely due the recent arrangement whereby the director of the institute holds concurrently the position of Professor of Epidemiology in the university.

Long a member of the Medical Society of Victoria and of the British Medical Association, he was elected to the Victorian Branch Council in 1922. He was found by his colleagues there to be a wise and forceful councillor. He had definite positive views based upon intense detailed study, not only of the immediate business but of the relevant background. He showed great powers of decision and

unremitting zeal whether in advocacy or opposition. He was president in 1929. He retired from the Council in 1937. He was vice-president of the Section of Surgery of the fourth session of the Australasian Medical Congress (British Medical Association), Hobart, in 1934 and of the fifth session at Adelaide in 1937. The Council of the Victorian Branch at a recent meeting adopted the following resolution:

The Council of the Victorian Branch of the British Medical Association records with regret the death of Bernard Traugott Zwar, C.M.G., M.D., M.S., F.R.A.C.S., who, as a member of the Branch Council, and its President in 1929, President of the Royal Melbourne Hospital, Deputy Chancellor of the University of Melbourne and the holder of many other public offices, rendered distinguished service to the medical profession and the people of Victoria. The Council extends its sympathy to his widow and his son, Dr. John Zwar.

In the University of Melbourne he was from 1924 to 1935 a Stewart Lecturer in Surgery. This involved, besides lecturing, much examining duty. The latter work, owing to the absence of many examiners on war service, he continued to perform until two years before his death. He was



a member of the Standing Committee of Convocation, 1924-1935, was elected to the Council in 1935, and, being reelected, remained a member until his death. He served through all these years on the Faculty of Medicine. He was Deputy Chancellor of the University in 1943 and 1944.

He was President of the Melbourne Medical Association in 1922-1923 and of the Melbourne University Association in 1935, President of the Royal Victorian Trained Nurses Association in 1922-1924, and chairman of the Nurses Board of Victoria in 1924-1927. He was one of the founders of the Royal Australasian College of Surgeons and a member of the Board of Censors, a member of the Medical Board of Victoria, and of the Advisory Committee to the Repatriation Commission, a member of the Anti-Cancer Council, and Honorary Treasurer of the Medical Defence Association of Victoria. He was made a Companion of the Most Distinguished Order of Saint Michael and Saint George in 1941. He was associated with the War Pensions Assessment Appeal Tribunal from its beginning. During the 1939-1945 war he sat as a member of Final Medical Boards at 115 Military Hospital, Heidelberg. He took great interest in returned servicemen, especially medical officers. It was a great pleasure to him that his son, Dr. John Zwar, was able to serve in the New Guinea campaign.

He loved his home, his pictures, his flowers and his books, and was a delightful host. As a young man he played lacrosse and was very fond of country walking. Later, however, he preferred tennis and golf, playing until within a few months of his death. He showed in sport the same concentration of purpose that he manifested in his work. The pleasant social relaxation in the late afternoon with the

game ended was a source of great delight to him as well as to his friends.

The discovery that he was the subject of a mortal illness found him brave and undismayed. His bearing during months of suffering and in face of oncoming death was noble and unforgettable. His life of public service and his devotion to what he considered the highest interests of the community, his absolute fairness and fearlessness, stand as an inspiration to those fortunate enough to have known him.

Lieutenant-General Sir Edmund Herring writes: I feel it is a great privilege and honour to have this opportunity of writing a few lines in memory of my friend "Zed". All he did for the honourable profession to which he belonged and the part he played in bringing into being the new Royal Melbourne Hospital will, I understand, be set forth by others more competent to appreciate the immensity of the contribution he has made. It is rather of the friendly courteous man himself that I would write and of his amazing courage. It was always a joy to be with him, for he had perhaps more than any man I know or have known a real and abiding gift for friendship. His knowledge and his interests were extremely wide, and his influence on people and especially on his large circle of friends has been immense. You could not spend any time with him, however short, without imbibing some of his great enthusiasm for all that was good and noble or being infected with some of his hatred and contempt for all that was petty and mean. Here was a man indeed who never lacked the moral courage to stand up for all he regarded as right or against what he knew to be wrong. Few men I feel are privileged to possess this great quality in such a marked degree. And perhaps never did his truly great qualities appear to greater advantage than in the last months of his life when stricken with what he knew was a mortal illness. All those who were privileged to associate with him during these last few tragic months were humbled by the wonderful courage and fortitude with which he bore his misfortune. And through it all until the very end he remained the same great and heroic figure, full of friendliness and thoughtfulness for others. It is not given to many to set such an example as he did, of how life should be lived and death should be faced and met. Many I know will be inspired and helped by his example. I would there were more like him. Humanity needs men such as he.

Dr. Victor Hurley writes: The passing of B. T. Zwar has removed one who for many years has been an outstanding personality and one of the leaders of the medical profession in Victoria. As a public spirited citizen his loss will also be greatly felt by the general community to which he gave so much selfless and valuable service.

Few men of his generation were so widely known and respected as he was, and those who worked with him in his various activities appreciated more and more the true calibre of the man and his real worth as their association continued. His breadth of interest was remarkable and his energy untiring. He was actively associated for many years with almost every professional organization or body in the State, and in most of them held high office—President and member of the Victorian Branch Council, Medical Defence Association, Faculty of Medicine, Council of the University of Melbourne, Victorian State Committee of the Royal Australasian College of Surgeons, Anti-Cancer Council, Medical Board of Victoria, Nurses Board, Board of the Walter and Eliza Hall Institute, President of the Royal Melbourne Hospital. These were some of his many activities.

In all these he was a driving force—farsighted in his outlook and ideas, and clear and forceful in their presentation. Once Zwar made up his mind on the policy to be followed he never wavered in the pursuit of his objective. He was an excellent president or chairman with an extraordinary knowledge of procedure—standing orders and the rules of debate—and always made it a point of informing himself fully beforehand of the matters to be discussed. He had a well-ordered mind with a remarkable memory, so that when difficult and often highly complicated matters were being discussed he would recall and quote the views expressed and the decisions arrived at when they were previously considered—perhaps several years before. He was scrupulously fair in debate, and while some might disagree with his views, none ever doubted his sincerity.

The project nearest to his heart and the one to which he devoted the greater part of his activities in later years was the rebuilding of the Royal Melbourne Hospital. For thirty years or more he was convinced of the necessity to transfer the hospital from the Lonsdale Street site in the city to its present position beside the university. When after protracted negotiations the hospital was rebuilt on the Lonsdale Street site in 1912, many regarded the matter as finally settled, but not Zwar—he had to wait for another thirty years to see his idea realized. The final negotiations

for the transfer and rebuilding were carried out during his period as president of the hospital, and the successful accomplishment of the project is a lasting tribute to his vision and courage in the face of many difficulties. During the war years when he undertook much additional work and responsibility, he personally supervised every aspect of the rebuilding operations to the exclusion of his own practice and personal affairs.

Zwar was always convinced that medical teaching, clinical work and research should go hand in hand. The rebuilding of the hospital also involved the transfer of the Walter and Eliza Hall Institute. The interests of the Royal Melbourne Hospital and of the university were both concerned in the institute, and Zwar being on the governing body of each of the three bodies, was largely responsible for the intricate negotiations which were carried out to a successful conclusion.

He had many other interests outside his professional and hospital activities. He put the same intensity and enthusiasm into his games as he did into his work. He loved his tennis and golf and was the moving spirit in the circle of enthusiasts with whom he played. He was an active member of the Wallaby Club for many years and intimately knew most of the walks and beauty spots within a day's journey of Melbourne. He was a keen bridge player and played with zest and carefree abandon—on occasions a persistent over caller, but would advance to the attack and meet the inevitable defeat with the utmost gallantry and goodwill. He had a keen appreciation of books and pictures and the breadth of his reading was remarkable in one who had so much of his time taken up by his various activities. He was one of the few remaining links between a famous generation of teachers in the late nineties and those of the present day. He was a resident under Sir Thomas Fitzgerald and Dr. John Williams, and in his earlier years of practice was associated with Dr. William Moore for whose views he had the utmost respect.

In the first World War he served overseas as a major in the Australian Army Medical Corps during the Dardanelles campaign and in Egypt—in the second World War he did much work for the services and the Repatriation Department.

As was to be expected by all who knew him, he showed his mettle in his last illness. As a surgeon he knew well what he had to face, but he met his difficulties without flinching and with the utmost fortitude. His main concern was not for himself, but for those around him and for those in whose care he was.

The deepest sympathy of all his many friends goes to his widow and son.

Dr. Geoffrey Owen writes: It is a pleasure and an honour to comply with the request to write a short account of my association with B. T. Zwar's early professional career—when we were intimately associated. My first meeting with Zwar—Zed, as he was always known to us—dates to early in March, 1895, when we found ourselves walking down to the old dissecting room at the bottom of the Adelaide University grounds; from this meeting sprang a friendship which lasted unbrokenly for fifty-two years, and which has been very precious to me.

Zwar, from the outset showed himself to be a first-class student; his work was marked by enthusiasm and painstaking; in his three years at the University of Adelaide he obtained first-class honours on each occasion, and shared the Thomas Elder and Davies Thomas Exhibitions.

The Adelaide Hospital trouble made it impossible for students to complete their course there; accordingly Zwar and the writer emigrated to Melbourne, where the former entered Ormond College to complete his medical studies at the University of Melbourne, and in his final year there he obtained first-class honours, the Exhibition in Medicine, and was placed first on the list for the seven resident positions at the Melbourne Hospital; incidentally one might mention that four of those seven residents have now passed on.

Zwar proved himself an excellent resident, and his good work at the hospital attracted the attention of the late Sir G. Syme and the late Mr. W. Moore, with the result that later on he became intimately associated with these two distinguished surgeons in their practices.

Following on his period at the Melbourne Hospital, Zwar went as superintendent to the Austin Hospital, Heidelberg; in those pre-motoring days the bicycle was very popular, and on frequent occasions in company with the late Dr. Richard Stawell and the late Mr. Hamilton Russell the writer used to call in at the hospital for a cup of tea and a chat after a country ride on our way back to Melbourne.

The year 1903 found Zwar and the writer in London doing work at various hospitals, and our close association came about again when Zwar came as clinical clerk to Sir William Gowers at the National Hospital, Queen's Square, where the writer was resident physician. There followed several

months of stimulating work together in that noted hospital with its famous staff. On returning to Melbourne in 1904 our paths separated, Zwar remaining in Melbourne to build up his splendid career, which must be portrayed by the pen of some colleague intimately associated with Zwar in that work.

In conclusion, I should like to add a few words on Zwar's general outlook in life. To me it appears that his three main characteristics were his honesty of purpose, his straightforwardness and his absolute loyalty; having once made up his mind to what was right, nothing would move him; for compromise he had no time. His character evoked the admiration and respect of the great majority of Melbourne people who knew him—professional and civil—finally borne out by the large numbers of people who lately assembled to pay their last respects to his memory.

ROY LE PAGE MUECKE.

Dr. F. W. Simpson has forwarded the following appreciation of the late Dr. Roy Le Page Muecke:

Dr. Roy Le P. Muecke was born in Adelaide and educated at Saint Peter's College and the University of Adelaide. He was a nephew of Dr. Francis Muecke, of the London Hospital, and Ada Crossley, the famous contralto. After doing post-graduate work at the London Chest Hospital, Dr. Muecke came back to the Perth Hospital as medical registrar and later became medical superintendent. He held this position for nine years until his death from sudden heart failure at the early age of thirty-seven.

I do not think any superintendent has ever worked harder. Day and night he toiled, and his ambition was to see the new Perth Hospital finished and in use. However, he was to be disappointed, as death took him too soon. It would seem paradoxical that a man of such Herculean dimensions should fall because of physical frailty. It was a great loss to the medical profession and the people of Perth. He was chiefly interested in the tuberculous, and many of these unfortunates have expressed their grief at his early demise. We offer to his young wife and his two baby daughters our sympathy.

ARTHUR WHITFIELD.

We regret to announce the death of Dr. Arthur Whitfield, which occurred on January 31, 1947, at London, England.

DOUGLAS GORDON POSTLE.

We regret to announce the death of Dr. Douglas Gordon Postle, which occurred on February 22, 1947, at Adelaide.

ERIC HOPE STAPLES.

We regret to announce the death of Dr. Eric Hope Staples, which occurred on March 26, 1947, at Bellevue Hill, Sydney.

JOHN DANIEL HERLIHY.

We regret to announce the death of Dr. John Daniel Herlihy, which occurred on April 19, 1947, at Lewisham, New South Wales.

Australian Medical Board Proceedings.

NEW SOUTH WALES.

THE undermentioned has been registered, pursuant to the provisions of the *Medical Practitioners Act, 1938-1939*, of New South Wales, as a duly qualified medical practitioner:

Rawstron, Richard Ewart, M.B., Ch.B., 1941 (New Zealand), Royal Hospital for Women, Paddington.

The following additional qualifications have been registered:

English, James Cameron, 363, Rocky Point Road, Ramsgate (M.B., B.S., 1931, Univ. Sydney), D.T.M., D.T.H., 1944, Univ. Sydney.

Hudson, Rodney James, Sydney Hospital, Sydney (M.B., 1940, Univ. Sydney), B.S., 1944, Univ. Sydney.
 Monk, Ivan, 37, Raglan Street, Mosman (M.B., 1940, Univ. Sydney), M.S., 1946, Univ. Sydney.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Finckh, Gertrude Dorothea, M.B., B.S., 1946 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.
 Butler, John Lachlan, M.B., B.S., 1943 (Univ. Sydney), 62, Moruben Road, Mosman.
 Smith, Charles James Ross, M.B., B.S., 1946 (Univ. Sydney), 84, Fitzwilliam Road, Vaucluse.
 Ormiston, Roslyn Isabel, M.B., B.S., 1946 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.

Corrigendum.

AN unfortunate mistake has occurred in Tables I and II in the article entitled "The Value of the Cold Pressor Test in the Prediction of Hypertension and Toxemia in Pregnancy", by Vera I. Krieger and Sara Weiden, which was published in the issue of April 5, 1947, at page 417. In Table I, the square containing the heading "Average Basal Blood Pressure (Millimetres of Mercury)" should be left blank, and each of the four subheadings "Number of Patients" should read "Average Basal Blood Pressure (Millimetres of Mercury)". In Table II, the square containing the heading "Casting Blood Pressure (Millimetres of Mercury)" should be left blank, and each of the three subheadings "Number of Patients" should be replaced by "Casting Blood Pressure (Millimetres of Mercury)". We regret this error.

Medical Appointments.

Dr. R. de Garis Burnard has been appointed honorary clinical assistant to the radiotherapy department of the Royal Adelaide Hospital, Adelaide.

Dr. B. C. Smeaton has been appointed honorary clinical assistant to the radiotherapy department of the Royal Adelaide Hospital, Adelaide.

Dr. N. J. Royle has been appointed government medical officer at Holbrook, New South Wales.

Dr. G. A. S. Douglas has been appointed acting visiting medical officer, "Eventide", Sandgate, Queensland, under the provisions of *The Charitable Institutions Management Act of 1885*.

The following have been appointed members of the Advisory Committee for the purposes of the *Pure Food Act, 1908*, of New South Wales, in accordance with Section 6 (2) of the act: Dr. E. S. Morris, Dr. E. L. Morgan, Dr. H. G. Wallace, Dr. J. G. Drew and Dr. H. W. T. Chenhall.

Books Received.

"The 1946 Year Book of General Medicine", edited by George F. Dick, M.D., J. Burns Amberson, M.D., George R. Minot, M.D., S.D., F.R.C.P. (Edinburgh and London), William B. Castle, M.D., S.M., M.D. (Hon.), Utrecht, William D. Stroud, M.D., George B. Eusterman, M.D.; 1946. Chicago: The Year Book Publishers, Incorporated. 7" x 4½", pp. 774, with illustrations.

"Chemotherapeutic and Other Studies of Typhus", by M. Van den Ende, C. H. Stuart-Harris, F. Fulton and J. S. F. Niven, with C. H. Andrews, A. M. Begg, W. J. Elford, M. H. Gleeson White, W. L. Hawley, K. C. Mills, F. Hamilton and C. C. Thomas; 1946. Medical Research Council of the Privy Council, Special Report Series Number 265. London: His Majesty's Stationery Office. 9½" x 6", pp. 266, with illustrations. Price: 12s. 6d.

"Basic Science in Nursing Arts", by Sister Mary Agnita Claire Day, S.S.M., R.N.; Second Edition: 1947. St. Louis: The C. V. Mosby Company. 8½" x 5½", pp. 726, with illustrations.

"Recent Advances in Clinical Pathology", by various authors, produced under the auspices of the European Association of Clinical Pathologists. General Editor: S. C. Dyke, D.M. (Oxford), F.R.C.P. (London). Section Editors: Bacteriology, R. Cruickshank, M.D. (Aberd.), F.R.C.P. (London); Bio-

chemistry, E. N. Allott, B.Sc., B.M., B.Ch. (Oxford), F.R.C.P. (London); Hematology and Cytology, B. L. Della Vida, M.D. (Rome); Histology, A. H. T. Robb-Smith, M.D. (London), 1947. London: J. and A. Churchill, Limited. 8" x 5½", pp. 486, with illustrations. Price: 25s.

"A Practical Handbook of Psychiatry for Students and Nurses", by Louis Minski, M.D., F.R.C.P., D.P.M.; 1946. London: William Heinemann (Medical Books), Limited. 7½" x 4½", pp. 136. Price: 6s.

Diary for the Month.

MAY 1.—South Australian Branch, B.M.A.: Council Meeting.
 MAY 2.—Queensland Branch, B.M.A.: Branch Meeting.
 MAY 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 MAY 7.—Victorian Branch, B.M.A.: Branch Meeting.
 MAY 7.—Western Australian Branch, B.M.A.: Council Meeting.
 MAY 9.—Queensland Branch, B.M.A.: Council Meeting.
 MAY 13.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 MAY 13.—Tasmanian Branch, B.M.A.: Ordinary Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmalm United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute; Brisbane City Council (Medical Officer of Health). Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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